TECHNOLOGY DEPT.

A National Newspaper for Every Branch of the Industry

Automotive Daily News

★CARS★ SHOP EQUIPMENT TRUCKS ★★AVIATION★★ PARTS ACCESSORIES ★TIRES★

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First Copy

January Production Set At Minimum of 120,000; Close to Total Last Year

Ford Uncertainty Confuses Estimates—Some Executives Expect Month to Exceed January, 1932, Output

Detroit, Jan. 25. — The January production situation in this motor man's town is considerably confused in spite of the fact that most of the working month is now behind us. One important production executive told a representative of Automotive Daily News that the record would surpass that of the same month in 1932. Some others do not believe that this is true, but they acknowledge that the figure will be close. As usually happens the Ford situation is obscure, with estimates of the month's output running from 5,000 units upward.

From the best information in hand it seems likely that General Motors in all its divisions will reach a total output of at least 68,000 vehicle units. Chrysler will probably run, for all its family, somewhere between 20,000 to 25,000 units. Ford may show 5,000 and may double that total; it is hard to guess at the moment.

This much we do have to bank on; last January Ford turned out somewhat under 13,000 units. The Ford situation then was not very different from that which exists now, a new model being in the offing and finally making its appearance in June. The new Ford models, which are now on the fire will appear long before that, although there may be considerable delay in announcing one or more units in what will be the complete line. Uncle Henry is still the sphinx.

However, with the facts that are known about production in the plants of several large producers, it appears certain that the industry's output in January, 1933, will at the minimum approximate that of 1932, which was 123,075. There is a fair chance that this month's production may surpass that of last January. With all conservatism the estimate of this newspaper at the present time is 120,000 vehicle units for January, 1933. This will do to go on with until we are able to present our usual monthly survey, based on actual figures for most of the companies. This estimate will appear in Automotive Daily News sometime next week.

DECEMBER TRADE OFF LESS THAN NORMAL

Washington, Jan. 25.—Industrial production declined by less than the normal seasonal amount during December, the Federal Reserve Board announced as of January 25.

As a result of the less than seasonal decline, the board's adjusted index production at factories and mines moved upward for the first time since in September, 1932, according to additional information made available. The index in December stood at 66 per cent. of the 1923-25 average.

Increased activity at automobile factories preparatory to the introduction of new models, and a less than seasonal decline in lumber production, were the principal factors contributing the firmness of tone during December, the board declares. Steel production, after dropping off sharply in December, has advanced again during the opening weeks of January.

Following the lead of industrial production, freight traffic dropped off less than is ordinary for the season in December, the board says.

WARNER AND PRESCOTT ARE HONORED BY S.A.E.

Detroit, Jan. 25.—Edward P. Warner, editor of Aviation, and Ford L. Prescott, senior mechanical engineer of the United States Army air corps, stationed at Wright Field, Dayton, O., were honored here today by receiving respectively the Wright and Manly memorial medals, awarded annually by the Society of Automotive Engineers.

The presentation took place at the evening session of the annual meeting of the S. A. E., with W. B. Stout acting as chairman. Of the two, the Wright medal is awarded for the best paper presented before the society dealing with aircraft, and the Manly medal for the best paper dealing with engines, during the year just ended. Neither recipient's paper was presented at the meeting now in progress, but at earlier meetings.

A feature of the business session, which preceded the evening session,

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FISHLEIGH PROTESTS OVER STANDARDIZATION

Detroit, Jan. 25.—There was very keen interest among the engineers gathered here in the streamlining session of the S. A. E., which began at 2 o'clock with W. C. Keys in the chair. Two extremely interesting papers were down for reading, one by W. T. Fishleigh, consulting engineer of Detroit, and the other by W. E. Lay of the University of Michigan, assisted by Charles D. Holton and Robert B. Patterson.

W. T. Fishleigh

In his inspiring paper Fishleigh condemns what he calls "super-standardization" and urges a complete revision of present car design. He received a stirring welcome in the meeting. Mr. Fishleigh had nothing but praise for the society's detail standardization of parts and materials, but criticized in no uncertain terms the industry's "super-standardization" which tends to make all cars look very much alike and to throttle the important revisions in general design which are urged as imperative to meet present-day conditions.

In general, the arguments advanced are similar to those expressed recently in these columns by Mr. Fishleigh, as well as in an earlier paper before the society, but their reiteration and reinforcement by graphical illustrations and pertinent, challenging questions which the in-

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S.A.E. Sessions Foreshadow Revolutionary Design Changes

True Streamlining, Engines in the Rear, Radical Changes in Chassis Suspension, Await Only O. K. of Executives

Special from A. D. N. Detroit Bureau.

Detroit, Jan. 25.—Anybody who attended today's sessions of the Annual Meeting of the Society of Automotive Engineers and left without a conviction that radical changes are in store for tomorrow's automobile either lacked in perception or in faith that the engineer can consummate the progressive program that the speakers offered.

Starting at 10 o'clock this morning with the pertinent criticisms of today's cars that were contained in the paper by Herbert Chase, engineering editor of Automotive Daily News, and ending with the wallops handed out by Walter Fishleigh in his potent remarks about the need for taking advantage of the present engineering advances to produce cars in step with the times, the sessions seethed with interest and with the feeling that the industry must soon yield to pressing needs for changes in the design of its products.

Current belief points to the probability that streamlining worthy of the name is likely to sweep the industry, perhaps within this year, to be followed shortly, if not accompanied by, a complete change in chassis design with the engine and all propulsive mechanism shifted to the rear of the vehicle. A goodly proportion of engineers are sold on the need for such alterations, and merely await the O. K. of conserva-

(Continued on Page 2)

COURTNEY PROPOSES FIGHT TO ELIMINATE TRUCKING RACKETS

Chicago, Jan. 25.—States Attorney Thomas J. Courtney made his first public appearance since his election last fall at the nineteenth annual banquet of the Cartage Exchange of Chicago at the Palmer House last Saturday evening and asked the more than 500 members and their guests present to co-operate with him in the elimination of rackets in the motor truck as well as all other industries.

"I want to congratulate the Cartage Exchange on its success in combating the machinations of the racketeer, and incidentally I wish to ask the members to aid my office in the protection of legitimate business," said Mr. Courtney, whose address was broadcast via station WMAQ.

Others at the speakers' table included President John Broderick, J. L. Donnelly, vice-president of the Illinois Manufacturers' Association; Si Mayer, president of the Auto-

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CADILLAC FORMS EAST AND WEST SALES AREAS

Detroit, Jan. 25. — Appointments announced today by J. C. Chick, general sales manager of the Cadillac Motor Car Company, reveal the establishment by the company of Eastern and Western sales areas under direct supervision of assistant

R. L. Newton

Don E. Ahrens.

general sales managers with headquarters at Detroit.

The Western territory, including the districts of Detroit, Chicago, Kansas City, Dallas, Los Angeles and San Francisco, are under the supervision of Don E. Ahrens, who has

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N. J. SIGNAL DEVICE REPEAL BEFORE HOUSE

Trenton, N. J., Jan. 25.—A bill to repeal the mandatory directional signal device has passed the Senate and awaits a hearing in the House. Another bill has been introduced in the Legislature by Assemblyman George Bradley making the use of directional signalling devices compulsory on all commercial vehicles

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Chase Criticizes Compromises In Present Day Car Designs

Suggests 3-Point Chassis Suspension, Less Weight, Roomier Bodies, Better Vision, Increased Accessibility, Simplified Control

Detroit, Jan. 25.—When the passenger car session of the S. A. E. got under way at 10 o'clock this morning, with Alex Taub in the chair, the first paper was one of constructive criticism of present-day cars and their engineering characteristics. Herbert Chase, engineering editor of Automotive Daily News, presented this stimulating paper, entitled "Pertinent Pokes for Satisfied Engineers," as follows:

By HERBERT C. CHASE
Engineering Editor, Automotive Daily News

In maikng these comments I am well aware that engineers with automobile companies are very rarely given an opportunity to design a car incorporating even a large proportion of the improvements they would like to see included. In general they are bound by conventions and inhibitions which require them to make the least possible change that will enable their company to get through another season with a satisfactory sales record. Sales departments dictate changes that may or may not be sound or desirable. Bankers are inclined to veto any expenditure for basic changes until they can be avoided no longer. "Let the other fellow do the pioneering. If it works we can always copy," is a rule that few engineers like, but many are forced to follow. It is not difficult to understand the economic philosophy back of this situation, but it is not my purpose to discuss that subject.

Herbert C. Chase

Unless some types of construction

(Continued on Page 3)

SEES 22,850,000 CARS NEEDED IN NEXT 5 YRS. FOR REPLACEMENTS

New York, Jan. 25.—An output of 22,850,000 automobiles will be necessary over the next five years in the United States if the cars worn out and scrapped from 1931 to the end of this period are to be replaced, according to an analysis of the motor car market just made by Sidney A. Swensrud, assistant to the president of the Standard Oil Company of Ohio.

Meeting this replacement demand would call for an average annual output of 4,570,000 cars from 1934 through 1938, the largest number ever produced for domestic use in any year except 1929.

"The average life of a car is from six to ten years," says Swensrud. "From 1923 through 1930 an average of 3,600,000 cars and trucks were sold in the United States. Accordingly, the indicated number to be scrapped every year over the next

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S. A. E. Papers Indicate Future Design Trends

(Continued from Page 1)

tive executives to start the most sweeping change in car design that has been seen for a generation.

Even the much neglected subject of riding comfort came in for its share of discussion by F. R. Atkinson of the Atkinson Spring Company. Walter C. Keys delved into the subject of automatic transmissions; E. E. Wemp, Long Manufacturing Company, discussed the "New A-B-C in Clutch Design," and A F Denham gave his views on the "Future of Low-Pressure Balloon Tires." Amos Northup of the Murray Corporation of America told of results gained from a study of foreign body designs. F. F. Kishline of Graham discoursed on aluminum cylinder heads. Finally, but far from least, came the paper by Prof. Walter Lay and his associates at the University of Michigan, in which he presented engineers with the much needed specific information required for effective streamlining. His paper showed as a result of actual tests what can be gained by definite alterations in body design to realize the benefits of good streamlining.

Few engineers who were privileged to sit through these sessions will forget this as a red letter day in S. A. E. history.

BRIGGS CLOSES PLANTS AFTER WAGE DISPUTE

Detroit, Jan. 25.—The Mack Avenue plant of the Briggs Manufacturing Company has shut down following a wage dispute. Officials state that 200 of the 4,000 employees walked out. The Highland Park plant of this company has also shut down under similar conditions. There were 2,500 employees at the latter plant.

Robert Pierce, secretary of the company, said that there had been no trouble at either plant. The Briggs organization manufactures bodies for Ford cars, and also for other manufacturers.

OLDS-PONTIAC OPENS BIGGEST USED CAR MART IN DETROIT

Detroit, Jan. 25.—Opening of a new Olds-Pontiac used car establishment, the largest used car headquarters in Detroit, was announced today by Charles P. Brady, supervisor of midwest retail operations.

The used car headquarters, located in a modern four-story, fireproof structure at 5959 Cass Avenue, provides upwards of 75,000 square feet of floor area. Under the supervision of D. Ben Simpson, Detroit used car manager for B. O. P. and the personal management of C. D. White, the new headquarters offers a stock of from 150 to 200 used cars which range in price from the very lowest brackets up to $1,500. All reconditioning work on the used car stock is done by factory-trained mechanics at the Olds-Pontiac factory service branch.

Opening of the new Cass Avenue headquarters, according to Mr. Simpson, will not affect the operation of the big Olds-Pontiac used car store at 8600 Grand River Avenue, where N. C. Morris will remain in charge of an additional selection of eighty cars.

MILWAUKEE SHOW DRAWS ATTENDANCE OVER 60,000

Milwaukee, Wis., Jan. 25.—Attendance at Milwaukee's twenty-fifth annual automobile show which closed January 21 was over 60,000 for the week, according to Palmer E. Hanson, manager for the show. Business was satisfactorily brisk at the show, so far as the dealers were concerned, Mr. Hanson stated.

Shadbolt & Boyd Co, jobbers of automobile accessories as well as other items, held an exhibition of its own during the week in the sky room of the Plankinton Hotel. The business obtained as a result of the display was worth the trouble of putting on the show, according to Price M. Davis, president of the firm.

CHAPIN TO ADDRESS BUFFALO C. OF C. FEB. 1

Buffalo, Jan. 25.—Roy D. Chapin, former president of the Hudson Motor Company and now secretary of commerce in President Hoover's cabinet, will be the principal speaker at the annual dinner of the Buffalo Chamber of Commerce on February 1. Mr. Chapin has arranged a conference with local automobile manufacturers and dealers to be held during the day, prior to his address.

R. D. Chapin

FINANCIAL NEWS

JONES & LAUGHLIN STEEL

New York, Jan. 25.—Jones & Laughlin Steel declared a dividend of 25 cents on the 7 per cent. cumulative preferred stock, payable April 1 to holders of record March 13. In the two previous quarters the company paid 75 cents. The company for 1932 reports net loss of $7,910,149 after taxes, interest, depreciation and depletion, against net loss of $2,283,459 in 1931. For the quarter ended December 31 net loss was $1,717,290, compared with net loss of $1,682,919 in the preceding quarter and net loss of $1,549,948 in the final quarter of 1931. Profit and loss surplus at the end of 1932 was $56,685,951 against $67,291,440 at the end of 1931.

BUCKEYE STEEL

Columbus, O., Jan. 25.—Buckeye Steel Castings omitted the quarterly dividend of 25 cents on the common stock due at this time.

BLACK & DECKER

Baltimore, Jan. 25.—Stockholders of Black & Decker Manufacturing Company, Baltimore, will vote January 30 on a proposal to reduce the amount of capital represented by 293 354 no-par common shares to $1,491,770 from $6,262,730, transferring the difference of $4,770,960 to capital surplus. The company has 40 000 par $25 shares of preferred stock outstanding.

LOCK JOINT PIPE

New York, Jan. 25.—Lock Joint Pipe declared a monthly dividend of 33 1-3 cents a share on the no-par common stock, payable January 31 to stock of record of the same date, compared with 66 cents a share paid December 31.

N. J. SIGNAL DEVICE REPEAL BEFORE HOUSE

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so constructed that signals are not visible fifteen feet front and rear.

If the Senate bill repealing the mandatory signal device law is enacted by the House, it will restore the former situation, which made optional the use of hand signalling or mechanical devices that had been approved by the commissioner of motor vehicles.

CAMPBELL-EWALD CO., N. Y. OFFICES AT 1790 B'WAY

New York, Jan. 25.—New York office of Campbell-Ewald Company has been moved to 1790 Broadway, according to an announcement today. The new office provides increased space and is closer to the automobile center of the city than the old address at 292 Madison Ave.

DEFENDS CAREFUL DRIVER

Richmond, Va., Jan. 25 (U.T.P.S.)—It is fundamentally uneconomical to charge the careful driver with a mechanically fit car the same automobile liability insurance rate as is charged a careless driver or a driver with a defective car, according to T. McCall Frazier, director of the Virginia state division of motor vehicles.

WARNER AND PRESCOTT ARE HONORED BY S.A.E.

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devoted to aircraft, was the paper by the president-elect of the society, H. C. Dickinson, who is a well-known physicist and engineer, a former research manager of the society, and director of the heat and power division of the Bureau of Standards. Dr. Dickinson's scholarly address, entitled "The Mechanics of Recovery," is noteworthy because of the truly scientific approach with which the subject is treated.

Formal announcement was made of the election of officers for the year which ends with the close of the meeting now being held. A list of the nominees, headed by Dr. Dickinson, was published in these columns several months ago. As there was only one nominee for each office, nomination is tantamount to election.

Col. C. M. Young, assistant secretary of commerce, presented the only formal paper scheduled for the evening aircraft session, the subject being the "Air Transportation System of the United States. "At the afternoon session dealing with aircraft the following papers were presented:

"Indirect Air Cooling of Aviation Engines," J. H. Geisse, consulting engineer, Madison, Wis.

"Commercial Flight Test Equipment and Methods," A. L. MacClain, Pratt & Whitney Aircraft Co., and D. S. Hersey, United Aircraft and Transport Corporation.

"Airplane Flight Testing for Maximum Speed," F. M. Thomas and H. W. Fairchild, United Aircraft and Transport Corporation.

"Correlation of Propeller and Engine Power With Supercharging," F. W. Caldwell, Hamilton Standard Propeller Company, and F. M. Thomas, United Aircraft and Transport Corporation.

Attendance at the afternoon session was scattering, presumably because the subjects chosen are of interest chiefly to relatively small groups of specialists in the aircraft field.

CADILLAC FORMS EAST AND WEST SALES AREAS

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been assistant general sales manager for Cadillac during the past three years. Mr. Ahrens joined the organization sixteen years ago as a distributor in Spokane and Seattle and became manager of the Cadillac branch at Evanston, Ill., in 1925. Two years later he took over the Philadelphia branch of the company, remaining there until he came to Detroit.

The Eastern area, with the districts of New York, Philadelphia, Boston, Albany, Pittsburgh and Cincinnati, are in charge of Ray L. Newton, former regional manager of the Eastern and Great Lakes regions. His association with Cadillac dates back to 1920, when he became a field executive of the company. In 1929 he was appointed regional manager at New York, and for the past two years has directed activities of the Great Lakes region, with headquarters in Detroit.

"This new sales policy has been adopted," Mr. Chick said in announcing the appointments, "with a view to still further increasing our co-operation and maintaining an even closer contact with branches, distributors and dealers in the Cadillac organization."

MUELLER BRASS TO ABSORB SKY SPECIALTIES CORP.

Port Huron, Mich., Jan. 25.—Directors of the Mueller Brass Company, manufacturer of streamline fittings and parts for various products, have voted to take over and continue operation of the Sky Specialties Corporation, holder of basic patents covering the manufacture of airplane engine starters, of Detroit. Fred L. Riggin, executive secretary of the Mueller company, says it has not been determined whether the plant of the Sky corporation will be removed from Detroit to Port Huron.

SPARKS from DETROIT

42,000 Milers

* * *

Tires of Yesterday

* * *

Production of "Fancies"

* * *

Truck Sales Outlook

* * *

Chris Sinsabaugh—Detroit Editor

ALVAN MACAULEY, president of the National Automobile Chamber of Commerce and also head of Packard, has startled us by declaring that at least 4,500,000 of the twenty-odd million motor vehicles now on the roads in this country are at least seven years old.

Evidently Stuart G. Baits, chief engineer of Hudson, also was skeptical as I was, but since he conducted a little investigation of his own, while he does not see eye to eye with Macauley, he is now inclined to believe the N. A. C. C. president is right. The other day, when at a prominent local club, just out of curiosity, he checked up on speedometer readings of the cars parked on the club lot. Of the twenty cars inspected, the lowest mileage noted was 42,000. And the owners of these twenty cars all were prominent clubmen, supposedly men of means!

* * *

THE EXCITEMENT in Detroit occasioned by the "old-timer" photo contest, promoted in the way of ballyhoo for the local show, has caused Jim Kennedy, manufacturers' equipment sales manager in this territory for Goodrich, to dig into his desk drawer and file with me his personal nomination in the way of pictures.

The print showed a White Stanhope steamer of the vintage of 1901, the original of which is now at the Goodrich factory in Akron. Kennedy's interest in it was occasioned by the fact that the old ark carried four-inch Goodrich clinchers, which were inflated to eighty pounds pressure, and that by means of a hand pump! Eighty pounds pressure then and as low as fifteen now made us again marvel at the progress in tire building.

* * *

AS I POUND THIS OUT on the trusty Underwood, there comes to the desk a copy of the paper, "Future Trends in Pneumatic Tires," delivered at the Pittsburgh S. A. E. meeting by K. D. Smith, technical superintendent of Goodrich, which kinda hooks up with what Kennedy and I were talking about.

Smith discussed low-pressure tires, and in the course of his talk he declared that tests show that there is less probability of low-pressure tires blowing out at high rates of speed than with regular-sized tires, and he said that in taxicab service there is less puncturing with the low-pressure type.

And he affirmed that government tests show that there has been a reduction of wear and tear on public highways by motor vehicles at high speeds because of the adoption of pneumatics and the reduction of inflation pressures. Lower pressures have made higher speed possible and at the same time reduced the impact forces on the highway structure.

* * *

THE INDUSTRY'S LATE start on 1933 production is reflected in the scarcity of certain models. Evidently the factories are rushing through the so-called standard job, the four-door sedan, which seems to be the most popular, overlooking what might be called the fancy type, such as the convertibles. The convertibles are being displayed in the shows, but try and get delivery on one of them! It's like trying to pick up one of Pierce-Arrow's Silver Arrow sport jobs, which sell for $10,000. There are only five of these, and every one is being used for show displays.

It looks from where I sit as if the convertible is going to meet with a ready sale, but there's going to be a lot of frothing at the mouth waiting for them to come off the assembly lines.

* * *

JOHN H. THOMPSON, manager of Federal's Detroit branch, opines that in analyzing the posibilities of motor truck sales in Detroit and vicinity, it is evident that an increase in business is in sight.

"The truck industry, like all the others, has suffered severely since the good days of 1929," he says, "and in a keen desire to secure one's portion of the sales available evils have crept into our methods of operation, and it is going to be necessary for the truck companies to take drastic steps to correct the outstanding detrimental influences which have been tolerated in the past. For this purpose we are organizing a motor truck dealers' association, where constructive work can be accomplished, so as to make our operations more profitable. Our organization meeting already has been held."

Retail Salesmen—This Is Your Page

This department is devoted to the interests of the retail sales division of the industry. Salesmen, this is your department. Automotive Daily News wants you to get something from this department that will help you in your work on the firing line. It wants you to pass on your own experiences, success, failures to help your brother salesmen. Send in your story in the form of a letter, or even a postal card, and let us get it ready for publication. Your achievement or your mistake may help another salesman to make sales or avoid errors that cost you commissions.

Dealers read this page. Give us the benefit of your reactions on these problems that affect the work of your salesmen, the men on the firing line, the men who bring home the bacon or don't.

HEAVY ON USED CARS WAS THIS DEALER; HE ALSO HAD BRAINS

This is the story of an automobile dealer who, in the spring of 1932, found himself heavily loaded up with used cars, and the best new car selling season of the year impending. How he handled the situation is an inspiring story, which we gather from Chrysler sales and service management. The dealer in question is J. F. Oates, and Mr. Oates is telling the story:

Last spring we found ourselves in the unenviable but perhaps not unique position of having a good sized used car merchandising job on our hands. The best selling season of the year was immediately ahead, but it didn't take us long to discover that our customary methods of retailing our used cars wouldn't secure for us the volume necessary to reduct our used car inventory. Not only was ous used car outlook for from encouraging, but we could see little possibility of taking advantage of new car sales opportunities.

Used car prospects? There were plenty of them, but too few of them could make the necessary down payment. We had the used cars; they wanted them. We had the job of figuring out how to get together.

We considered the matter from every possible angle, and finally mapped out a plan. It was simple, direct and contained all the elements that would appeal to the prospective used car purchaser: (1) The down payment was low; (2) regular payments were small; (3) insurance—fire, theft and single interest collision—was provided; and (4) there was liberal provision for service and parts expense to which the purchaser might be obligated during his ownership of the car.

The accompanying advertisements, which we run once a week in the classified section of the Sunday edition of our newspapers, illustrate how we present this plan to the public. They are producing the business and, in the first three months of operation, we disposed of over a hundred used cars and to date we have not had a single repossession.

Some of the details of our operation of the plan are perhaps more interesting and explanatory than the plan itself, which, on the surface, may appear to be a risky departure from the conventional methods of doing a used car business.

At the outset, we made an itemized list of every used car in our stock by make, model, type and year. For each car we noted the book inventory cost and the period of time it had been in our possession. From this list all cars were classified in the following dollar groups—$100, $125, $145, $200. Then, in each instance, we added $25 flat, establishing prices of $125, $150, $170 and $225. And these are the prices at which the car is to be delivered to the buyer.

Without exception, the down payment on our used cars is $25. The balance is paid in weekly payments spread over a period of forty weeks. However, this period is extended if, during the forty weeks the customer increases his obligation to us through the purchase of service, parts, or accessories for his car. In such cases the payments continue at the same weekly rate until his entire account is settled. Yet, at no tme will we permit the unpaid balance to exceed the original unpaid balance. For example: If the purchaser of a $225 used car has made ten of his $5 weekly payments, reducing his original unpaid balance from $200 to $150, he can purchase service from us to the extent of $50. At the time of such a transaction we simply draw up a new note for the original indebtedness. Thus his payments will cover a period of fifty weeks instead of forty.

Prior to closing each deal, we make reasonably certain of the soundness of the transaction. A close check is made on the credit responsibility of the prospect and, in addition we have a very frank and complete understanding of the deal before delivery of the car is made. For instance, I personally ask the buyer several questions:

1. How many do you have in your family who are dependent on you?
2. How much money do you make weekly?
3. How much, on an average, do you spend weekly for groceries?
4. Are the members of your family unusually healthy or unhealthy? (The purpose of this question is to determine the probability of heavy doctor or drug bills.)

If a man draws his pay weekly, I ask him if he pays his grocery bill monthly. If so, I insist that he pay it weekly. I also insist that he set aside each week the amount of his rent and, after I have shown him how to apportion his weekly income for all set expense items, it is explained that the difference between their total and his weekly income is all the money he has to play with. He is also given to understand that we will not tolerate any defaults in payments, and we emphasize several times that we do not want him to make the investment unless he can see it through to completion.

Finally, it is made clear that we will not, under any circumstances, be forced to send out to make weekly collections. And, if for any reason the obligation is not met promptly, we will immediately take possession of the car. It is pointed out that we most certainly do not want the purchaser to waste his $25 payment and the amount of subsequent payments and, unless he is prepared to handle the deal, we recommend that he refrain from starting it.

If our customer is paid on a semi-monthly basis, we ask him to pay the $25 down payment plus one weekly installment. Subsequent payments are made every two weeks. If he is paid monthly, we ask him to pay the $25 down payment plus three weekly installments, and monthly thereafter.

Our advertising states: "You will buy from me personally because I will not pay any salesman's commission, as I am allowing the buyer the commission in making these prices." I find this extremely effective, since the buyer relishes the idea of dealing with the head of the house. However, we expect our salesman to complete the sale as he would in any other instance and, only after the customer's credit has been passed, is he brought to me for the interview and questions discussed above. Throughout the interview with a prospect, our salesmen emphasize that they are showing him the car as a personal favor, as they forego the regular commission they would ordinarily receive. When a sale is made, we credit the salesman who handled the customer with a suitable bonus.

The fact that we have not repossessed a single car under this plan is the source of a great amount of satisfaction to us. Not one of the hundred-odd purchasers of cars under this plan has been in arrears even for one week. To the contrary, we have numerous buyers who are from two to six weeks ahead in their payments and, as far as we know, every single buyer is a strong booster for us; which in itself is of no small value.

Under no circumstances do we permit a purchaser to have a bad battery. We deliver each car in honest condition as to mechanism, tires and battery and, if a battery develops defects within two or three months it is replaced with a new one without any argument. This, however, is not guaranteed at the time of the sale, as we make no promises whatever. We expect each unit delivered to run at least ten weeks before the purchase of anything by way of repairs will be needed. In our stipulation that service shall not exceed the amount paid on the car, we have been fortunate in that to date there have been no wrecked cars among those sold.

On an average, it appears that we will sell each purchaser of a used car under this plan sufficient parts, service, accessories, etc., necessary to run his contract for fifty-two weeks. It, of course, goes without saying that we make our regular profit on all of these service item sales and on the whole I anticipate that it will result in a very material increase in our service business. And, in many instances, our close contact with these customers will unquestionably result in a repeat sale at the end of the twelve-month period.

We are pleased with our experience with this plan and, if our present success with it continues, we will certainly adopt it as permanent at least with regard to our lower priced used cars.

SEES 22,850,000 CARS NEEDED IN NEXT 5 YRS. FOR REPLACEMENTS

(Continued from Page 1)

five years will approximate 3,600,000 units, or a total of 18,000,000.

"In addition, the number of cars scrapped for the three years 1931, 1932 and 1933 will exceed the number of new cars built by fully 4,850,000. In order to make good this loss and replace cars that are due to be scrapped, the total output must be 22,850,000 by the end of 1938.

"Even then such production would merely bring back the total number of cars in use in 1938 to the total of 1930, which was 25,040,000."

AMERICAN BRAKEBLOK PROMOTES H. A. GILLIES

New York, Jan. 25.—H. A. Gillies, for five years sales manager of the American Brake Materials Corporation, has been made vice-president in charge of sales. This action was taken at the annual meeting of the board of directors in New York.

H. A. Gillies

As the automotive and industrial division of the American Brake Shoe and Foundry Company, the American Brake Materials Corporation manufactures and markets American Brakeblok for all types of automotive and industrial applications. At the time Mr. Gillies first became associated with the American Brake Materials Corporation the organization was just beginning to actively enter the automotive field. Under his guidance, sales have steadily increased, until at the present time the American Brake Materials Corporation is recognized as one of the dominant factors in the brake lining industry.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Dealer Activities

LAWRENCE, MASS.

Swan Street Garage, 89 Swan St., Lawrence, has been appointed De Soto and Plymouth dealer.

* * *

MELROSE, MASS.

H. A. Grimes Motor Sales, 897 Main St., Melrose, has been appointed De Soto and Plymouth dealer.

* * *

GREAT FALLS, MONT.

The Western Auto Company of which J. W. Jordan is president and manager, and E. J. Jordan is secretary and treasurer, has been appointed Studebaker and Rockne distributors in northern Montana. The company has taken over the plant at 810 1st Ave. North, formerly occupied by the Jensen-Johnson Motor Company.

MASON CITY, IA.

The S. and R. Chevrolet Company is increasing its sales taff in anticipation of a brisk spring business in both its new and used automobile departments. Louis Swehla, well known in automobile sales circles, is the latest addition to the sales personnel.

* * *

CHESTER, PA.

De Soto Motor Corporation announces the appointment of John S. Miller, Inc., 9th and Sproul Sts., Chester, as De Soto and Plymouth dealer.

* * *

BURLINGTON, VT.

De Soto Motor Corporation has appointed Brewer Motor Company, 1 North Ave., Burlington, as De Soto and Plymouth direct dealer.

Rider Comfort Paramount In Car Design, Says Chase

(Continued from Page 1)

that seem more or less "ideal" are visualized by the designer, however, he is likely to proceed without a well-considered and well-balanced objective. Developments are apt to be aimed largely at curing minor difficulties and adding refinements without making them a part of a well-integrated plan. I shall not attempt to formulate such a plan here, for probably no two engineers would agree to it anyway. Yet I urge that each engineer do this for himself. He probably will never realize his ideal in full. He surely will never do so in one leap. But he may be surprised to find how much he can do piecemeal to bring it about. The formulation of an ideal involves making, in effect at least, a list of desirable and undesirable features which can be attained or avoided. When the opportunity for making changes comes, this list should be checked carefully to see how much of it can be utilized.

My purpose here is to record some items that ought, in my opinion, to be contained in such a list. This will necessarily involve criticism of existing construction. It ought to, but I shall try to make the criticism constructive. If we are satisfied with what we have today, we never shall improve it.

A Blanket Indictment?

As I see the situation, present cars are much too uncomfortable. They are too bulky, too unwieldy. Even for their size they are too heavy. In consequence, they cost too much to build and to operate. They are not sufficiently safe. They are too complex in construction and operation. They involve many petty annoyances. They lack many desirable refinements. They are too hard to service. Aside from these and a few other shortcomings, they are pretty good cars!

This might be called a blanket indictment. I hope it will not be considered an elderdown puff! I shall try, however, to be more uncomfortably specific.

One company has a very capable engineer who bears the title, "easy-riding engineer." From the standpoint of the riding public, I sometimes wonder whether there is any such individual. I am even told that there are few engineers who are sitting pretty these days. They certainly are not when bouncing between the roof and seat in cars of their own design traveling rough roads.

Discomfort No Delusion

I say present cars are uncomfortable partly because the discomfort starts even before one gets into them—on the way, in fact. So far as the driver is concerned at least, the discomfort often lasts for some time after he gets out! In the interim, it persists in varying degrees. One wit has said you can't even spit out of the present car without discomfort. He's right.

Before I run out of objectives, perhaps I should say that the present day car is needlessly, even absurdly, low. This phase of construction might be called "low-down" engineering, one of the lowest forms. In reference to the seats, however, the cowl bar is cruelly high. It is not a mere question of the driver seeing the front fenders—if he has any left. I have ridden in cars in which, when seated, I could barely see the radiator cap. By craning my neck I could see a little road far ahead of the car.

Call this exaggerated if you like. It applies to many cars, however, as well as to a large proportion of drivers, both male and female, and it's serious. It is one factor in making cars uncomfortable and unsafe. It is extremely tiring and for that and other reasons it is dangerous.

What's the excuse for this type of construction? There are two: (1) It looks better and (2) a low center of gravity makes for safety.

Let's analyze these "reasons." I readily concede that modern cars, in general, have achieved fine appearance and I am mindful that "looks" are a great sales asset. I concede also that present cars look better than some which were much more comfortable, so far as vision and certain other features are concerned, a few years back. What I strenuously deny is that good looks cannot be secured without absurdly low bodies, which are hard to enter and to leave. I also deny that a combination of high cowl and low seats is either esential or desirable. Body designers created this style. It's up to them, I think, to get us out of this ill-conceived phase of low down engineering and to show us something rightly proportioned and even better looking! I am satisfied not only that this can be but that it must be done.

As to that low center of gravity, let's remember that a moderately low center of gravity has an advantage chiefly in helping to prevent the overturn of a car. But overturning rarely occurs even with high centers. Too low a center, on the other hand, tends to increase skidding tendencies and to reduce the pressure of outer tires against the road (as compared to a higher center) when rounding a curve. This results in instability and creates, I believe, a far worse hazard than the high center of gravity.

Compromised Cars

Cars that are needlessly low involve too many compromises. Frames become more expensive to build and have to be made heavier. Ground clearance is barely sufficient on rutted roads or in deep snow. Adequate clearance over rear axles is hard to secure. It is almost impossible for any one to work under a car unless

(Continued on Page 4)

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

Published Every Day Except Sunday, Monday and Holidays and Tuesday When a Holiday Falls on Monday

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Superservice for Dealers

AUTOMOTIVE DAILY NEWS has warned its dealer readers many times in the past that the way to survival and the way to profits lie through intelligent development of the service side of their businesses. That warning is just as true in 1933 as it was in 1930 and succeeding years.

Regardless of depression, of reduced incomes of individuals and organizations, service is still a business yielding profits that run into a grand total of billions of dollars. Any dealer can look around him and see the service millions still rolling along in spite of conditions that have reduced or completely eliminated other profits that he usually earns.

The dealer in 1933 who expects to be one of the "fittest" who will survive this economic cataclysm through which we have passed will put his service department on the familiar basis of superservice.

Every dealer knows that many superservice stations are making money. They are making money from selling parts and equipment and gasoline and oil and tires, which the 24,000,000 people who still operate motor vehicles have got to have to continue to enjoy the benefits of their own motor transportation systems.

It does not cost a great deal in the way of preliminary investment to enter upon the business of completely supplying the needs and wants of motor vehicle operators. The companies selling motor fuel supply the equipment for dispensing gasoline. A complete lubrication outfit may be had on terms that permit it to pay for itself from the business it creates. A stock of parts is a normal part of any dealer's equipment and a stock of added equipment need cost little in first investment.

But the dealer who installs the necessary stock and equipment to care for all the motor vehicles user's needs and then sits back and waits for business to come, might just as well save himself the trouble. Service business does not come rolling in automatically. It has got to be gone after with all the energy and intelligence at the dealer's command.

First of all, the dealer who wants to go after superservice business must tell the world that he wants it and is prepared to give superservice. Advertising is the strong right arm of the superservice operator. Local newspapers should be used. Direct by mail pleas should go out. "Special sales," widely advertised, are a most valuable contribution to get business into the superservice station. Work out popular combinations of jobs to be done that can be grouped and offered at a reduced price and then tell the world about them.

And in talking about advertising, we must not neglect the vitally important item of personal solicitation. Not only should the proprietor seek opportunities of telling about his superservice department, but he should put his salesmen on the job of canvassing. No sale of a new car should be made that does not include a convincing presentation of the dealer's ability to render superservice.

And certainly no dealer can be oblivious to the new car sales opportunities that promotion of his superservice gives him. Any car owner brought into his shop for a special combination job of some sort becomes an immediate prospect for a new car of the make the dealer handles. If the superservice of the dealer's establishment is satisfactory, this fact in itself predisposes the car owner to consider the purchase of a new vehicle from a merchant who has served him well in another way.

It all comes back to a dictum that Automotive Daily News laid down years ago, that to be successful at this stage of the automotive game, the dealer must be a seller of complete motor transportation. The man who buys a new car buys transportation, continuous and satisfactory. If he doesn't get just that, he blames the dealer from whom he buys the car. There is only one safe way for a dealer today, and that is to sell the vehicle in the first place and then offer every form of maintenance and equipment that will make enjoyment of the transportation he has bought continuous and satisfactory.

Be a superservice dealer in 1933 and watch the profits grow.

Chase Spanks Sacrifices To Speed and Appearance

(Continued from Page 3)

it is jacked up or over a pit. Back axle design becomes difficult and is likely to require weight increases not needed otherwise, because the metal is not disposed to best advantage. Efforts to minimize the size of ring gears and differential housings, in combination with torque and power increases, tend to involve rapid gear wear. Now the automobile industry is asking the lubricant manufacturers to produce special extreme pressure lubricants so that gear sizes can be decreased and tooth pressures increased. To what length, indeed, will the automobile engineer not go to save an inch or two in chassis and overall body height? If half as much effort were spent in making the car more comfortable, the public and the manufacturer would profit immensely.

Rough-Riding?—Rather!

Even yet we have not touched upon the major cause of discomfort, namely, poor riding qualities. The latter arise through the use of an antiquated system of suspension, which is far inferior to other components of the car, especially when Hotchkiss drive is employed. Almost the only improvements in a decade in suspension systems is the use of longer springs and a few minor improvements in shock absorbers. It is high time that suspension received more attention.

Most cars ride hard on any but the smoothest roads, and wretchedly on rough roads at any but very slow speeds. I doubt whether this condition will be improved materially as long as a four-point chassis suspension continues. Many engineers apparently have jumped to the conclusion that a three-point mounting is all right for everything but the chassis, yet is unstable there.

How many have ever made a real analysis of a three-point chassis suspension or attempted to see whether its supposed faults could be overcome? I know one engineer who has done so, and he has at the same time produced not alone a stable car, but the finest riding one I ever drove. In addition, many steering difficulties are overcome. There is no shimmy, and tramp, if it occurs, has no perceptible effect upon the chassis. Moreover, chassis and body are relieved of twisting strains, and the whole car can be made considerably lighter. I wish I might give you fuller particulars, but I have been asked not to do so at present. I know, however, that riding not only can be, but has been, greatly improved. This result has also achieved a simpler construction and effected economy in manufacture and assembly.

Springing Spanked

Again, there is the question of spring types. Why adhere to the practically constant-length spring, now universal, especially as such a spring results in hard riding under light load, or is too weak for heavier loads? Some thoroughgoing research in the matter of unconventional springs should pay handsomely, especially as I hear that experiments with individual wheel springing have proved rather disappointing. I am confident, in any case, that highly unstable doughnut tires, as they exist today, and twelve-inch upholstery will prove quite unnecessary to give a superlative ride, even on rough roads, once a really good suspension for the chassis is developed. It is unfair, as well as unwise, to expect the tire designer and the shock absorber designer to make an inherently poor riding car into an easy riding one. Neither can accomplish the result desired.

There are many small refinements also that would tend to make cars more comfortable. Adjustable driver's seats should be placed on an incline, so that they rise when moved forward. The short-legged driver is also short of stature. When his seat needs to be moved closer to the pedals it also needs elevation, especially to enable something like reasonable vision over high cowl bars. There is much to be said, also, in favor of back seats that move up and down with the passenger, instead of polishing his back. If really good chassis suspension is secured, however, there will be no need for deep upholstery. The passenger will not be jounced about. Something more closely resembling a comfortable living-room armchair will be adequate. If springs are properly designed, the vertical acceleration will never exceed the gravitational rate, and passengers will never be jounced off the seat or be subjected to other discomfort now resulting from poor springing. In that event, comparatively thin upholstery will be adequate. As it is, grab-holds are needed in rear seats, and top bows "crown" the passenger with more or less regularity if the driver fails to see or to heed rough spots in the road.

Top bows at points over passengers' heads should be eliminated if possible; if not, they should be well padded, as a blow that may fracture the skull is not at all impossible with present low cars, high speeds and sudden jolts which the driver cannot always avoid.

Bemoans Bulk

As to excessive bulk in the present car, much ought to be said. What has been done, in effect, is to design the chassis according to accepted standards, devoting almost half its length to an excessively long engine and cowl, and then to stow what one might suppose is the comparatively unimportant load (the passengers) in the cramped remaining space termed the body! Isn't it time to consider the motor car as primarily a means for conveying passengers in as much comfort as possible? Would it not be logical to dispose of the passenger properly, first, and then treat the means for propulsion as something to be placed in remaining space? If this were done, we certainly would have a very different vehicle from the present one! Bus designers are beginning to do exactly this. It is time that passenger car designers did likewise.

Looking at an average present-day passenger car in plan view, what do we find? Scarcely 40 per cent. of the area it occupies is devoted to useful load-carrying space. The remainder, or about 60 per cent., including bonnet, cowl, fenders and running boards, a useless space between the spring horns and often as much or more space back of the rear seat, is a total loss so far as carrying useful load is concerned. This arrangement is not logical and not good economy. I do not contend that all the waste space can be converted into useful load-carrying purposes, but I am sure that a much larger proportion of it can be and ought to be so converted, and the total size of the vehicle materially decreased. If this were done, cars would be far less bulky, less unwieldy, easier to maneuver, lighter, and considerably less expensive. If, then, a really good suspension were provided, they would also be more comfortable.

Of course, it is easier to add to the wheelbase if we want more room, and "let well enough alone," so far as general layout is concerned, than to start with a new and sound conception and try to put it into practical form. I suppose we shall continue to follow the former course until somebody develops a really advanced type of car. Then it will be easy to copy!

Space Makers

Aside from the engine, we get along pretty well with most of the mechanism of the car below the body platform. Modern engines also require very little attention. Why couldn't they be put "below decks" too? They could be, of course, and perhaps be made no less accessible than at present. I think they should be. Flat opposed engines have some important advantages that might be realized. White has pointed the way in a bus engine. For reasons which I have explained at length in a paper before the society, I think the engine belongs in the rear of the car, but a flat engine would not necessarily have to be placed there if a forward mounting were preferred. Such an engine might be made to yield much more space for passenger carrying.

With proper frame design, much more space could be gained by including the area now devoted to running boards within the body. Even without a change in engines, this could be done. It would afford a lot more space for luggage if not wanted for passenger accommodation.

Fenders, as we know them today, can and should be eliminated, but wheel houses, so far as I can see, must remain. Some space above the wheel houses might well find utility for package or other compartments, however.

With recessed wheels, fenders eliminated, body sides made almost flush with the wheel hubs and the engine stowed away below decks or in the rear of the chassis, a much cleaner exterior would be presented. "True" streamlining would then be much more readily applied than at present. It is a highly desirable step, even without the body changes suggested above, although it means rather radical changes in appearance. But whether streamlining is wanted or not, headlamps and other protuberances should be faired into the structure so that the completed car presents a much cleaner (and a much more easily cleaned) exterior than at present.

Irritating Ifs

If, as I anticipate, we come to a three-point chassis suspension, body structures are likely to change materially. Much of the stiff and heavy bracing now required can be eliminated if the body is relieved of the severe twisting strains imposed at present. It is a question whether so-called "all-steel" bodies will survive. Steel shells may do so. Wooden members may remain, but some light

(Continued on Page 5)

Calendar of Coming Events

JANUARY

20-28—**New York, N. Y.** National Association of Engine and Boat Manufacturers, boat show, Grand Central Palace.

21-28—**Montreal, Canada.** National motor show of eastern Canada. Stadium Building, Adelstau Levesque, general manager.

21-28—**Boston, Mass.** Boston Automobile Dealers Association, Boston Commercial Motor Vehicle Association, show, Mechanics Building. Chester I. Campbell, manager.

21-28—**Jersey City, N. J.** Automobile Show. Midtown Auto Salon, Frank Galland, manager.

21-28—**Baltimore, Md.** Auto Trade Association of Maryland, show. Location undetermined. John E. Raine, manager.

21-28—**Detroit, Mich.** Detroit Automobile Dealers Association, show. H. H. Shuart, manager.

21-28—**Syracuse, N. Y.** Syracuse Automobile Dealers Association show. C. H. Hayes, manager.

22-26—**Detroit, Mich.** Society of Automotive Engineers, annual meeting. Book-Cadillac.

22-28—**Hartford, Conn.** Hartford Automobile Dealers Association show, State Armory. Arthur Fifoot, manager.

23-28—**Rochester, N. Y.** Rochester Automobile Dealers Association Show, Edgerton Park, A. C. Lohman, executive secretary.

23-28—**Pittsburgh, Pa.** Pittsburgh Automobile Dealers Association show W. N. Owings, manager.

25-28—**Harrisburg, Pa.** Harrisburg Automotive Trade Association show, New Farm Show Building.

25-28—**Vineland, N. J.** Automobile Show in Cresci Building.

27-Feb. 15—**Cairo, Egypt.** International Salon.

28-Feb. 4.—**Portland, Me.** Portland Automobile Dealers Association, show, Exposition Building. L. P. Borman, manager.

28-Feb. 4—**Chicago.** National Automobile Show, Coliseum.

28-Feb. 5—**Washington, D. C.** Washington Automotive Trades Association, show.

30-31—**Chicago, Ill.** National Automobile Dealers Association, convention, Medinah Athletic Club.

30-Feb. 4—**Springfield, Mass.** Automobile show.

FEBRUARY

1-11—**Indianapolis.** Twenty-second annual show, Indiana State Fair Grounds.

4-11—**St. Paul, Minn.** St. Paul Auto Dealers Association Show.

6-11—**Ottawa, Canada.** Ottawa Automotive Trade Association show, Coliseum. L. M. McCoy, chairman advertising committee.

6-11—**Denver, Col.** Automobile show.

7-11—**York, Pa.** York County Automobile Dealers Association, Inc., show. R. C. Keller, president.

9-11—**Springfield, Ill.** Springfield Automobile Dealers Association, show.

9-12—**South Bend, Ind. Automobile Show.**

11-15—**Trenton, N. J.** Annual Automobile Show, Trenton Armory. John L. Brock, manager.

11-17—**Toledo, O.** Toledo Automobile Dealers Association Show.

11-18—**Kansas City, Mo.** Kansas City Motor Car Dealers Association Show. Geo. A. Bond, manager.

18-23—**Columbus, O.** Automobile Show in Columbus Auditorium.

22-25—**Evansville, Ind.** Evansville Automobile Dealers Association Show, Otto Hartmetz, president.

25-Mar. 4—**Seattle, Wash.** Seattle Automotive Trades Association Show.

MARCH

5- 7—**New Orleans.** Automobile Show in Municipal Auditorium. Gordon Herbert, manager.

10-19—**Geneva, Switzerland.** International Automobile Show.

Chase Urges Reduce Weight To Cut Cost; Add Comfort

(Continued from Page 4)

and reasonably flexible synthetic materials combining heat and noise-insulating properties, with ability to resist weathering and the attacks of insects and other organisms is not beyond possibility. The advent of a flexible and substantially non-breakable glass substitute would be a great boon and is not at all unlikely. One much lighter than glass, even though more easily scratched, would have advantages. These latter items are not likely to have much effect upon design in the near future, but they should not be overlooked as possible future developments.

The lighter weight and the space economies pointed to as possibilities should go far toward making cars that are less cumbersome and easier to handle. Weight saving, besides reducing power requirements and making a lighter and more economical engine feasible, reduces the size of tire required and makes steering easier, a thing much to be desired. If the car is less bulky and lighter it will be easier to park and to handle in other ways. Small cars with short wheelbase are often associated with hard-riding qualities, but I greatly doubt whether this follows of necessity. One of the best authorities I know on the subject is certain that large size is not essential to good riding. Henry M. Crane said recently that many people think a small light car a good thing for the other fellow, but are disinclined to buy them for their own use. I am willing to concede the truth of this statement as applied to present cars, but I question its validity if we succeed in making a really comfortable and commodious small car such as I have tried to visualize.

I am inclined also to take issue with the "castiron" school of engineering, the school that is always adding weight to overcome structural weakness. This school contends that metal is cheap, and that, at a few cents a pound, it is a good investment. Its advocates seem to glory in weight. One of them, at least, advertises weight as a desirable asset. An engineer with another maker of a car who once took pride in building a really light car for its size reports a weight increase of about 1,000 pounds, say 35 per cent., in three or four years. The present car "performs" better, but I question whether the larger part of the weight increase was essential to this result. The car carries no more passengers, is considerably less economical in fuel, is harder to steer, and costs this maker (on a basis of equal commodity prices and equally efficient production methods) a lot more to produce, unless I am much mistaken. It is typical of many other cars in this respect.

Really efficient weight saving is costly only when it requires more machine work, more expensive or more wasted material. Weight increase runs in a vicious circle. A heavier car requires a more powerful engine; a larger and heavier engine requires other parts of greater weight, and again more power is needed to care for extra weight, etc. Weight saving reverses the process and it can be attained, I am convinced, by following some of the foregoing suggestions and without any sacrifice in enduring qualities.

As I see it, the present trend toward cars that are larger and heavier is unfortunate. It is true that purchasers like roominess and comfort, but I have tried to indicate that neither of these desirable qualities requires of necessity a more bulky or a heavier vehicle. If the designer really makes up his mind to provide adequate passenger space within narrower over-all limits, he can do so. He can also provide the required degree of comfort in riding without resort to undue bulk or weight.

Although car designers are to be complimented upon engine developments which have enabled marked power increase within the past decade, they still have a long way to go in achieving compactness, light weight, and higher economy. Books might be written on this subject without covering all its aspects. I shall mention only a few items, and these with full understanding that the problems involved are not easy of solution and will require costly development work.

Much might be gained by studying aircraft engines and adaptation of certain of their features. Certainly some different cylinder arrangement than a simple in-line one might help both in weight saving and compactness. The possibilities in this direction will be still greater if the engine is not confined in a narrow hood.

Departures from the conventional four-stroke cycle deserve further investigation, especially as a throttling four-stroke engine is inherently inefficient under the light loads of average use. The two-stroke cycle, though often condemned because of past crudities, has some remarkable possibilities

(Continued on Page 8)

CURRENT PRICES OF PASSENGER CAR MODELS

AUBURN—8-cyl. 127 W. B.
Standard Models—1933

2 Coupe	748	5 Cabriolet	895
5 Brougham	795	5 Phaeton	945
5 Sedan	845	7 Sed. (136 W. B.)	945

AUBURN—8-cyl. 127 W. B.
Custom Dual Ratio

2 Coupe	895	5 Phaeton	1095
5 Brougham	945	Speedster	1095
5 Sedan	995	7 Sed. (136 W. B.)	1095
5 Cabriolet	1045		

AUBURN—8-cyl. 127 W. B.
De Luxe Dual Ratio Models

2 Coupe	895	5 Phaeton	1095
5 Brougham	945	Speedster	1095
5 Sedan	995	7 Sed. (136 W. B.)	1095
5 Cabriolet	1045		

AUBURN—8-cyl. 127 W. B.
Salon Models

5 Brougham	1,195	5 Phaeton	1,345
5 Sedan	1,245	Speedster	1,345
5 Cabriolet	1,295		

AUBURN—12-cyl. 127 W. B.
Salon Models

5 Brougham	1,695	5 Phaeton	1,845
5 Sedan	1,745	Speedster	1,845
5 Cabriolet	1,795		

AUBURN—12-cyl. 133 W. B.
Standard Models

2 Coupe	1145	5 Sedan	1245
5 Brougham	1195		

AUBURN—12-cyl. 133 W. B.
Custom Dual Ratio Models

2 Coupe	1295	5 Cabriolet	1445
5 Brougham	1345	5 Phaeton	1495
5 Sedan	1395	Speedster	1495

AUBURN—12-cyl. 133 W. B.
Custom De Luxe Dual Ratio Models

2 Coupe	1295	5 Cabriolet	1445
5 Brougham	1345	5 Phaeton	1495
5 Sedan	1395	Speedster	1495

AUSTIN—4-cyl. 75 W. B.
1933 Models

Business Coupe	275	Roadster	305
Spl. Business Coupe	295	Sub. Coupe	315
		Sub. Coupe	375

BUICK—33-50 Series. 119 W. B.
1933 Models

2 Coupe	995	5 Coupe	1,065
Special Coupe	1,030	Con. Coupe	1,115
Sedan	1,045		

BUICK—33-60 Series. 127 W. B.

Special Coupe	1,279	Con. Coupe	1,365
Sedan	1,310	Con. Phaeton	1,585
5 Coupe	1,310		

BUICK—33-80 Series. 130 W. B.

Sport Coupe	1,495	Con. Coupe	1,575
5 Coupe	1,540	Con. Phaeton	1,845
Sedan	1,570		

BUICK—33-90 Series. 138 W. B.

5 Coupe	1,785	7 Sedan	1,955
5 Sedan	1,805	7 Limousine	2,055
5 Cl. Cpl. Sedan	1,820		

CADILLAC V-8—8-cyl. 134 W. B.
Series 355-C. Body by Fisher
1933 Models

2 Coupe	2,695	2 Conv. Coupe	2,845
2 Roadster	2,795		

CADILLAC V-8—8-cyl. 140 W. B.
Body by Fisher

5 Sedan	2,895	7 Sedan	3,045
5 Phaeton	2,895	7 Imperial	3,195
5 Coupe	2,895	5 A.W. Phaeton	3,395
5 Town Sedan	2,995		

CADILLAC V-8—8-cyl. 140 W. B.
Body by Fleetwood

5 Sedan	3,295	5 Town Cab.	3,995
7 Sedan	3,445	7 Town Cab.	4,145
7 Limousine	3,645	7 Lim. Brough.	4,145

CADILLAC V-12—12-cyl. 134 W. B.
Series 370-C. Body by Fisher

2 Coupe	3,395	2 Conv. Coupe	3,545
2 Roadster	3,495		

CADILLAC V-12. 12-cyl. 140 W. B.
Body by Fisher

5 Sedan	3,595	7 Sedan	3,745
5 Phaeton	3,595	7 Imperial	3,895
5 Coupe	3,595	5 A.W. Phaeton	4,095
5 Town Sedan	3,695		

CADILLAC V-12. 12-cyl. 140 W. B.
Body by Fleetwood

5 Sedan	3,995	5 Town Cab.	4,695
7 Sedan	4,145	7 Town Cab.	4,845
7 Limousine	4,345	7 Lim. Brough.	4,845

CADILLAC V-16—16-cyl. 149 W. B.
Series 452-C. Body by Fleetwood

5 Sedan	6,250	Town Cabriolet	
7 Sedan	6,400	(Opera Seats)	6,850
7 Limousine	6,600	Town Cabriolet	6,850
		7 Lim. Brough.	6,850

CHEVROLET—6-cyl. 110 W. B.
1933 Models

Sport Roadster	485	Sport Coupe	535
Coupe	495	Sedan	565
Coach	515	Cabriolet	565
Phaeton	515		

CHRYSLER—6-cyl. 117 W. B.
1933 Models

2 Business Coupe	795	5 Sedan	845
4 Brougham	795	4 Con. Coupe	885
4 Coupe (R.S.)	835	5 Con. Sedan	1,055

CHRYSLER—8-cyl. 126 W. B.
Royal Eight Models

2 Business Coupe	945	4 Con. Coupe	1,035
2-4 Coupe (R.S.)	985	5 Con. Sedan	1,195
5 Sedan	995		

CHRYSLER—8-cyl. 126 W. B.
Imperial Eight Models

2-4 Coupe (R.S.)	1,355	Con. Coupe	1,425
5 Coupe	1,395	Con. Sedan	1,595
5 Sedan	1,395		

CHRYSLER—8-cyl. 146 W. B.
Custom Imperial

5 Cl. Cpl. Sedan	2,895	Con. Cp. Road	3,295
7 Sedan	2,995	5 Phaeton	3,395
7 Sed. Limous.	3,295		

CONTINENTAL—4-cyl. 101½ W. B.
Bezeon Models

2 Roadster	355	2-dr. Sedan	380
Coupe	380	4-dr. Sedan	395

CONTINENTAL—6-cyl. 107 W. B.
Flyer Models

Roadster	450	2-dr. Sedan	510
Coupe	490	4-dr. Sedan	535

CONTINENTAL—6-cyl. 114 W. B.
Ace Models

Coupe (R.S.)	725	De Luxe Sedan	815
Stand. Sedan	745		

CORD—8-cyl. 137½ W. B.

Sedan	2,395	Cabriolet	2,495
Brougham	2,395	Phaeton Sedan	2,595

DE SOTO—6 cyl. 114¾ W. B.
Standard Models (1933)

2 Business Coupe	695	2-4 Coupe (R. S.)	735
5 Brougham	695	5 4-dr. Sedan	765

DE SOTO—6 cyl. 114¾ W. B.
Custom Models

5 Spl. Brougham	725	2-4 Con. Coupe (R. S.)	845
5 Sedan	835	5 Con. Sedan	975

DODGE SIX—6 cyl. 111¼ W. B.
1933 Models

2 Business Coupe (5 wire or wood wheels, R. M.)	595	2-4 Coupe (R. S.) (6 wire wheels, 2 P. W.)	640
2-4 Coupe (5 dem. wood wheels, R. M.)	640	5 Salon Brougham	660
2-4 Coupe (R. S.) (5 wire or wood wheels, R. M.)	640	5 Sedan (5 wire or wood wheels, R. M.)	670
		5 Sedan (6 wire or wood wheels, 2 P. W.)	670

DODGE—8-cyl. 122 W. B.

2-4 Coupe (R.S.)	1,115	5 Con. Coupe	1,185
5 4-dr. Sedan	1,145	5 Con. Sedan	1,395
5 Coupe	1,145		

ESSEX—6-cyl. 106 W. B.
1933 Terraplane Standard Models

2 Roadster	425	4 Coupe (R.S.)	545
2 Coupe	495	5 Sedan	565
5 Coach	515		

ESSEX—6-cyl. 106 W. B.
Terraplane Special Models

4 Roadster	525	5 Sedan	605
5 Coach	555	4 Conv. Coupe	605
4 Coupe (R.S.)	580		

ESSEX—8-cyl. 113 W. B.
Terraplane Eight Models

2 Coupe	645	5 Sedan	725
5 Coach	650	4 Conv. Coupe	725
4 Coupe (R.S.)	685		

FRANKLIN—6-cyl. 118 W. B.
Olympic 1933 Models—Series 18

5 Sedan	1,385	4 Conv. Coupe	1,500
2 Coupe	1,385		

FRANKLIN—6-cyl. 132 W. B.
Series 16

5 Sedan	1935	Conv. Coupe	2,300
Club Sedan	1935	Victoria Brough.	2,445
7 Sedan	2135	Limousine	2,695
Coupe	2,345		

FRANKLIN—12 cyl. 144 W. B.
Series 17

5 Sedan	2,885	7 Sedan	2,985
5 Club Brough.	2,885	7 Limousine	3,185

FORD—V-8. 106 W. B.

Roadster	460	De Luxe Coupe	525
Coupe	490	Fordor Sedan	590
Phaeton	495	Victoria	600
Tudor Sedan	500	Cabriolet	610
De L. Roadster	500	De Luxe Fordor Sedan	645
Sport Coupe	535		
De L. Phaeton	545	Con. Sedan	650
De L. Tudor Sed.	550		

FORD—4-cyl. 106 W. B.

Roadster	410	De Luxe Coupe	525
Coupe	440	Fordor Sedan	540
Phaeton	445	Victoria	550
Tudor Sedan	450	Cabriolet	560
De L. Roadster	450	De Luxe Fordor Sedan	595
Sport Coupe	485		
De L. Phaeton	495	Con. Sedan	600
De Luxe Tudor Sedan	500		

GRAHAM—6-cyl. 185 O. A.*
1933 Standard Models

2 Coupe	745	5 Sedan	795
4 Coupe (R.S.)	795	4 Conv. Coupe	835

GRAHAM—8-cyl. 191 O. A.*
Standard Models

2 Coupe	845	5 Sedan	895
4 Coupe (R.S.)	825	4 Con. Coupe	935

GRAHAM—8-cyl. 195 O. A.*
Custom Models

2 Coupe	1,045	5 Sedan	1,095
4 Coupe (R.S.)	1,095		

HUDSON—6-cyl. 113 W. B.
1933 Super-Six Models

Business Coupe	765	5 Phaeton	835
Coach	795	Sedan	865
Coupe (R.S.)	815	Conv. Coupe	915

HUDSON—8-cyl. 119 W. B.
Standard Eight

Coach	1,075	Sedan	1,145
4 Coupe	1,095	Conv. Coupe	1,245

HUDSON—8-cyl. 132 W. B.
Major Eight Models

5 4-dr. Touring Sedan	1,395	Club Sedan	1,495
Brougham	1,495	7 Sedan	1,495

HUPMOBILE—6-cyl. 121 W. B.
1933 Models

5 Sedan	995	Victoria	1,060
2-4 Coupe (R.S.)	995	Cabriolet	1,095

HUPMOBILE—8-cyl. 122 W. B.

Coupe	1,125	Victoria	1,260
5 Sedan	1,195	Cabriolet	1,295

HUPMOBILE—8-cyl. 126 W. B.

5 Sedan	1,445	Victoria	1,510
Coupe	1,445	Cabriolet	1,545

LA SALLE V-8—8-cyl. 130 W. B.
Series 345-C. Body by Fisher
1933 Models

5 Sedan	2,245	2 Conv. Coupe	2,395
2 Coupe	2,245	5 Town Coupe	2,395

LA SALLE V-8—8-cyl. 136 W. B.
Body by Fisher

5 Town Sedan	2,495	7 Imperial	2,645
7 Sedan	2,495		

LINCOLN V-12—12-cyl. 136 W. B.
1933 Models

Open Road	2,700	5 Coupe	3,200
Open Road (R.S.)	2,745	Phaeton (With ton. cowl and windshield)	3,200
Phaeton	3,000		
2 Coupe	3,100		
Town Sedan	3,100	7 Touring	3,200
2 Coupe (R.S.)	3,145	7 Sedan	3,300
Con Road (R.S.)	3,200	7 Limousine	3,350
5 Sedan	3,200		

LINCOLN—V-12—12-cyl. 145 W. B.

Phaeton	4,200	Berline (2 windows) (Judkins)	5,500
7 Touring	4,300		
5 Coupe	4,300		
Phaeton (Tonneau cowl and windshield)	4,400	Berlin (3 windows) (Judkins)	5,500
Town Sedan (2 windows)	4,400	Con. Coupe (Brunn)	5,700
Town Sedan (3 windows)	4,400	Limousine (Willoughby)	5,700
5 Sedan	4,500	Sed. Limousine (Judkins)	5,800
Con. Road (R.S.) (Le Baron)	4,500	Con. Sedan (Deitrich)	6,100
7 Sedan	4,600	Non.-Col. Cabriolet (Brunn)	6,900
7 Limousine (With drop partition)	4,800	Semi-Col. Cabriolet (Brunn)	6,900
2 Coupe (Dietrich)	4,900	Brougham (Brunn)	6,900
Coupe (Judkins)	5,000	Pan. Brougham (Willoughby)	7,000

NASH—6-cyl. 116 W. B.
1933 Big Six Models

5 4-dr.-4-Window Sedan	695	2-4 Coupe (R.S.)	745
2 Coupe	725	5 4-dr.-6-Window Sedan	745

NASH—8-cyl. 116 W. B.
Standard Eight Models

2 Coupe	830	5 4-dr.-6-Window Sedan	845
5 4-dr.-4-Window Sedan	830	2-4 Coupe (R.S.)	845
		2-4 Conv. Road.	900

NASH—8-cyl. 121 W. B.
Special Eight Models

2 Coupe	965	2-4 Coupe (R.S.)	1,015
5 4-dr.-4-Window Town Sedan	975	2-4 Con. Road.	1,055
5 4-dr.-6-Window Sedan	1,015	5 2-dr. Conv. Sedan	1,095

NASH—8-cyl. 128 W. B.
Advanced Twin Ignition Eight Models

2 Coupe	1,255	2-4 Conv. Road.	1,395
2-4 Coupe (R.S.)	1,275	5 Victoria	1,395
5 4-dr.-6-Window Sedan	1,320	5 4-dr. Con Sedan	1,575

NASH—8-cyl. 133-142 W. B.
Ambassador Twin Ignition Models

2-4 Coupe (R.S.)	1,545	5 4-dr.-4-Window Brougham	1,820
5 4-dr.-6-Window Sedan	1,575	5 4-dr. Conv. Sedan	1,875
2-4 Conv. Road	1,645	7 4-dr. Sedan	1,955
5 Victoria	1,785	7 4-dr. Limou.	2,055
5 4-dr.-6-Window Sedan	1,855		

OLDSMOBILE—6-cyl. 115 W. B.
1933 Models

Business Coupe	745	5 Sedan	825
5 Coupe	745	Conv. Coupe	825
Touring Coupe	775	Touring Sedan	855
Sport Coupe	780		

OLDSMOBILE—8-cyl. 119 W. B.

Business Coupe	845	5 Sedan	925
5 Coupe	845	Conv. Coupe	925
Touring Coupe	875	Touring Sedan	955
Sport Coupe	880		

PACKARD—8-cyl. 127½ W. B.
1933 Models

5 Sedan	2,150	Coupe Sedan	2,190
2 Coupe	2,160	Coupe Roadster	2,250

PACKARD—8-cyl. 136 W. B.

2 Coupe	2,350	5 Coupe	2,440
5 Phaeton	2,370	7 Sedan	2,455
5 Sedan	2,385	7 Limousine	2,550
Club Sedan	2,390	Con. Victoria	2,780
5 Touring	2,390	Con. Sedan	2,890

PACKARD—8-cyl. 135 W. B.
Super Eight Model

5 Sedan	2,780

PACKARD—8-cyl. 142 W. B.
Super Eight Models

2 Coupe	2,780	7 Sedan	3,090
Coupe Road	2,870	5 Spt. Phaeton	3,150
5 Phaeton	2,890	7 Limousine	3,280
Club Sedan	2,975	Conv. Victoria	3,440
5 Coupe	2,980	Conv. Sedan	3,590
5 Tourer	2,980		

PACKARD—12-cyl. 142 W. B.

2 Coupe	3,720	5 Coupe	3,890
5 Phaeton	3,790	Spt. Phaeton	4,090
Coupe Roadster	3,850	Conv. Victoria	4,490
5 Sedan	3,860	Conv. Sedan	4,650
Club Sedan	3,880		

PACKARD—12-cyl. 147 W. B.

7 Sedan	4,085	7 Limousine	4,285

PACKARD—12-cyl. 147 W. B.
Custom Models

Spt. Phaeton (Dietrich)	5875	Con. Sedan (Dietrich)	6570
Sta. Coupe (Dietrich)	6000	Formal Sedan (Dietrich)	7000
Con. Victoria (Dietrich)	6070	A. W. Cabriolet (Le Baron)	7000
Con. Runabout (Dietrich)	6085	A. W. Town Car (Le Baron)	7000

PIERCE-ARROW—8-cyl. 130 W. B
Standard Models—1933

2 Club Brougham (Trunk on rear)	2385	5 Sedan	2575
		5 Club Sedan	2595

PIERCE-ARROW—8-cyl. 139 W. B.
Standard Models

7 Sedan	2859	7 En. Dr. lim.	2975

PIERCE-ARROW—8-cyl. 136 W. B.
Salon Models

Club Brougham (Trunk on rear)	2550	5 Sedan	2740
		5 Club Sedan	2860

PIERCE-ARROW—8-cyl. 139 W. B.
Salon Models

7 Sedan	3015	7 En. Dr. Lim.	3140

PIERCE-ARROW—12-cyl. 136 W. B.
1236 Standard Models

5 Club Brougham (Trunk on rear)	2785	5 Sedan	2975
		5 Club Sedan	3095

PIERCE-ARROW—12-cyl. 139 W. B.
1236 Standard Models

7 Sedan	3250	7 En. Dr. Lim.	3375

PIERCE-ARROW—12-cyl. 137 W. B.
1242 Custom Models

5 Club Brougham (Trunk on rear)	3650	5 Tourer	3950
		5 Spt. Phaeton	4150
5 Sedan	3785	(Ton. Windscr'n)	
2-4 Coupe (R. S.)	3785	5 Club Berline (Trunk on rear)	4150
Con. Coupe Rdr. (R. S.)	3900	5 Con. Sedan (Trunk on rear)	4250
5 Club Sedan (Trunk on rear)	3950		

PIERCE-ARROW—12-cyl. 142 W. B.
1242 Custom Models

7 Sedan	3985	7 Tourer	4250
7 En. Dr. Lim.	4250		

PIERCE-ARROW—12-cyl. 142 W. B.
1247 Custom Models

5 Sedan	4295	5 Club Berline (Trunk on rear)	4600
5 Club Sedan (Trunk on rear)	4400		

PIERCE-ARROW—12-cyl. 147 W. B.
1247 Custom Models

7 Sedan	4535	Town Bro'm (Small Quarter Windows, Brunn)	6700
7 En. Dr. Lim.	4800		
Con. Victoria (Le Baron)	5200	Town Bro'm (Large Quarter Windows, Brunn)	6700
Coupe (Metal Back, Le Baron)	5300		
Coupe (Leather Back, Le Baron)	5600	Town Car (Stationary rear quarter, Brunn)	6700
Club Sedan (Le Baron)	5700	Town Cab'let (Collapsible rear quarter, Brunn)	7200
Con. Sedan (Le Baron)	5700		
Con. Sed. with partition (Le Baron)	6100	En. Dr. Bro'm (Limousine Front, Brunn)	7200
En. Dr. Limousine (Le Baron)	6200		

PLYMOUTH—6-cyl. 107 W. B.
1933 Models

2 Stan. Coupe	495	5 Sedan	545
2-4 Spt. Coupe (R.S.)	525	2-4 Con. Coupe	565

PONTIAC—8-cyl. 115 W. B.
1933 Models

2 Roadster	585	2-dr. Trav. Coupe	675
5 2-dr. Sedan	635	2-4 Con. Coupe	695
2 Stan. Coupe	635	4 dr. Sedan	695
4 Coupe (R.S.)	670		

REO—6-cyl. 113½ W. B.
1933 Flying Cloud Models

Stan. Sedan	995	Elite Sedan	1090
Stan. Coupe	995	Elite Coupe	1090
St. Con. Coupe	1045	Elite Con. Coupe	1146

REO—8-cyl. 131 W. B.
Royale Models

Stan. Sedan	1745	Elite Sedan	1845
Stan. Victoria	1745	Elite Victoria	1845
Stan. Coupe	1745	Elite Coupe	1845

ROCKNE—6-cyl. 110 W. B.
1933 Standard Models

5 Coach	585	4 Coupe	620
2 Coupe	585	4 Conv. Road.	675
5 Sedan	615	5 Conv. Sedan	695

ROCKNE—6-cyl. 110 W. B.
De Luxe Models

5 Coach	630	4 Coupe	665
2 Coupe	630	4 Conv. Road.	720
5 Sedan	660	5 Conv. Sedan	740

STUDEBAKER—6-cyl. 117 W. B.
1933 Standard Models

2 Pass. Coupe	865	5 St. Regis	940
4-Pass. Coupe	915	Brougham	940
5 Sedan	940	5 Conv. Sedan	1,040
4 Conv. Road.	940		

STUDEBAKER—6-cyl. 117 W.B.
Regal Models

2 Pass. Coupe	970	5 St. Regis	1,045
4 Pass. Coupe	1,020	Brougham	1,045
5 Sedan	1,045	5 Conv. Sedan	1,145
4 Conv. Road.	1,045		

STUDEBAKER—8-cyl. 117 W. B.
Commander Standard Models

2 Pass. Coupe	1,025	5 St. Regis	1,100
4-Pass. Coupe	1,075	Brougham	1,100
5 Sedan	1,100	5 Conv. Sedan	1,220
5 Conv. Road.	1,120		

STUDEBAKER—8-cyl. 117 W. B.
Commander Regal Models

2 Pass. Coupe	1,130	5 St. Regis	1,205
4 Pass. Coupe	1,180	Brougham	1,205
5 Sedan	1,205	5 Conv. Sedan	1,325
4 Conv. Road.	1,225		

STUDEBAKER—8-cyl. 125 W. B.
President Standard Models

4 Pass. Coupe	1,355	5 St. Regis	1,415
5 Sedan	1,415	Brougham	1,415
4 Conv. Road.	1,415	5 Conv. Sedan	1,575

STUDEBAKER—8-cyl. 125 W. B.
President State Models

4 Pass. Coupe	1,460	5 St. Regis	1,520
5 Sedan	1,520	Brougham	1,520
4 Conv. Road.	1,520	5 Conv. Sedan	1,680

STUDEBAKER—8-cyl. 135 W. B.
President Speedway Models

4 Pass. Coupe	1,655	4 Conv. Road.	1,735
5 Sedan	1,715	7 Sedan	1,865
5 St. Regis	1,715	5 Conv. Sedan	1,885
Brougham	1,715	Limousine	1,965

STUDEBAKER—8-cyl. 135 W. B.
President Speedway State Models

4 Coupe	1,760	4 Conv. Road.	1,820
5 Sedan	1,820	7 Sedan	1,970
5 St. Regis	1,820	5 Conv. Sedan	1,960
Brougham	1,820	Limousine	2,070

STUTZ—6-cyl. 127½ W. B.
1933 LAA Models

5 Coupe	1995	5 Club Sedan	1995
5 Sedan	1995	Cabriolet Coupe	2285
2 Coupe	1995		

STUTZ—8-cyl. 134½ W. B.
SV-16 Challenger Series

5 Coupe	2425	2 Speedster	2580
5 Sedan	2780	Cabriolet Coupe	2880
2 Coupe	2780	Torpedo Sp'dster	2980
Club Sedan	2880		

STUTZ—8-cyl. 145 W. B.
SV-16 Challenger Series

7 Sedan	3245	Cabriolet Coupe	3445
7 Limousine	3445	5 Conv. Sedan	3495

STUTZ—8-cyl. 134½ W. B.
DV-32 Challenger Series

5 Coupe	3195	5 Club Sedan	3580
5 Sedan	3480	Cabriolet Coupe	3680
2 Coupe	3480	Torpedo Sp'dster	3680
2 Speedster	3580		

STUTZ—8-cyl. 145 W. B.
DV-32 Challenger Series

7 Sedan	3945	7 Limousine	4145
Cabriolet Coupe	4145	5 Conv. Sedan	4195

WILLYS-OVERLAND—4-cyl. 156 O. A.*
1933 Models

2 Coupe	395	4 Sedan	445
4 Coupe	425	Custom Sedan	475
4 Custom Coupe	445		

WILLYS-OVERLAND—6-cyl. 174 O. A.*

Prices not available—range $595 to $695. Knight engine available at $100 extra.

*O. A.—Over-all length of chassis instead of wheel base.

(Recent price changes in bold face)

INDIANAPOLIS CUTS SHOW TICKETS TO 40c.

Indianapolis, Ind., Jan. 25.—In order to increase interest in the local automobile show, to be held February 4 to 10, efforts are being made by directors of the Indianapolis Automobile Trade Association and individual distributors to bring to the city at least some of the specially featured attractions that proved popular with New York show visitors and which will largely be exhibited at Chicago next week.

In view of the fact that the Indianapolis show opens the day Chicago closes, it was anticipated that much of the special material could be rushed to Indianapolis Saturday night and be placed on the show floor before the opening of the exhibit on Sunday, the second day.

Prices of admission also have been scaled down, a reduction from 50 to 40 cents resulting in an actual saving of 15 cents on each paid admission, inasmuch as the 50-cent fee would have called for a 5-cent tax.

BEAUTY CONTEST

Richmond, Va., Jan. 25 (UTPS).—Prizes of $25, $15 and $5 will be awarded in the filling station beautification contest to be conducted by the Federation of Richmond Garden Clubs, beginning February 1, and ending July 1, it was decided at the January meeting of the federation, just held here.

CHANGES NAME

Pawtucket, Jan. 25.—The five stores operated in this state and Massachusetts by Kaufman & Chernick, Inc., automobile accessory and radio dealers, hereafter will be known as the Kay-Cee Cut Price Auto Stores, instead of the Cut Price Auto and Radio Stores.

CUMULATIVE NEW PASSENGER CAR

Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising Service, Springfield, Ill., and New Jersey, in the New York state total. Some of these data have been published previously, but is given here complete for the convenience of our subscribers.

In this table, 36 states and the District of Columbia **Returns for today: California, Kentucky,**

States	AUBURN GROUP			CHRYSLER GROUP					FORD GROUP			GENERAL MOTORS GROUP						
	Auburn	Cord	Totals	Chrysler	De Soto	Dodge	Plymouth	Totals	Ford	Lincoln	Totals	Buick	Cadillac	Chevrolet	La Salle	Oldsmobile	Pontiac	Totals
Arizona					2	12	19	33	71	1	72	8		25		1	3	37
Arkansas							3	3	32		32	1	1	14				16
California	63		63	62	69	176	842	1149	1129	31	1160	109	17	239	22	48	55	490
Connecticut	6		6	19	9	32	166	226	142	2	144	52	3	118	3	6	28	210
Delaware	1		1	3	1	1	21	26	35	1	36	18	2	36	1	3	5	65
Florida	4		4	11	7	16	209	243	396	1	397	31	5	210	1	11	31	289
Georgia	2		2		5	7	57	69	124	2	126	14	1	121		4	15	155
Idaho							5	5	14	1	15	2		15				17
Illinois	10	1	11	37	29	73	372	511	296	14	310	51	19	200	20	20	45	355
Indiana	6	1	7	8	16	32	128	184	221	3	224	21	3	165	1	14	17	221
Kansas	1		1	2	2	7	25	36	146	4	150	6		92		7	15	120
Kentucky	8		8	5	7	48	196	256	258	3	261	19		203		1	12	235
Maryland	4		4	19	9	42	191	261	182	1	183	25		220	1	8	27	281
Michigan	8		8	24	33	224	660	941	786	3	789	141	14	671	7	31	52	916
Minnesota	3		3	14	8	22	206	250	165	2	167	11	1	138	2	22	22	196
Missouri	3		3	17	31	62	283	393	417	5	422	28	5	294	1	19	33	380
Montana	1		1	1		2	4	7	19		19			5			6	11
Nebraska	2		2	1		7	29	37	79		79	4		66		7	5	82
Nevada						1	2	3	2		2	3		4		1	1	9
New Jersey	6		6	28	24	137	604	793	390	5	395	130	13	427	9	37	100	716
New Mexico				1		9	33	43	70		70	5	1	54	1	2	3	66
New York	11	1	12	34	36	102	648	820	570	13	583	116	31	326	7	37	98	615
N. Carolina	2		2	15	6	46	215	282	405	1	406	25	1	306	3	6	24	365
North Dakota							2	2	12		12			6				6
Ohio	12	1	13	59	110	228	1170	1567	1092	19	1111	123	9	1029	12	63	148	1384
Oregon	1		1	5	3	4	48	60	113	2	115	15		69	1	4	1	90
Pennsylvania	23	1	24	121	121	282	1606	2130	1249	18	1267	277	18	957	37	96	211	1596
Rhode Island	1		1	6	8	13	97	124	63	1	64	23	2	25	3	1	6	60
South Carolina	1		1	4	1	5	60	70	168	1	169	8	2	95	1	2	6	114
South Dakota						2	9	11	44		44			26		2	5	33
Utah							4	4	13		13	1		5				6
Vermont				4	1	3	17	25	30		30	1		13		1	3	18
Virginia	3	1	4	9	9	26	160	204	334	1	335	23	1	155	3	9	38	229
Washington	2	1	3	15	25	49	191	280	198	1	199	23	1	141		10	27	202
West Virginia	3		3	6	6	35	201	248	161		161	11		78	2	8	22	121
Wisconsin	1		1	6	12	45	200	263	215		215	28	3	140	3	10	28	212
Dist. of Col.	6		6	5	7	29	83	124	106	2	108	25	2	92	1	7	36	163
Line Total	194	7		541	597	1779	8766		9747	138		1378	155	6780	142	498	1128	
Group Total			201					11683			9885							19081
Arizona, 1931	4		4	4	7	5	21	37	41		41	31		113		6	2	152
Arkansas, 1931						2	6	8	19		19	2		12			2	16
California, 1931	54	3	57	106	170	184	358	818	1056	14	1070	581	35	1661	20	65	118	2480
Connecticut, 1931	15	3	18	21	24	25	57	127	147	1	148	146	11	356	3	24	72	612
Delaware, 1931	1		1	7	3	2	8	20	49	1	50	32	2	92		11	17	154
Florida, 1931	11	2	13	51	5	33	194	283	474	1	475	157	3	694		15	64	933
Georgia, 1931				2	4	3	12	21	109		109	24	3	170	1	9	7	214
Idaho, 1931				4	4	3	4	15	53	1	54	7		54		1	2	64
Illinois, 1931	39	7	46	53	40	54	139	286	448	13	461	240	51	623	40	82	94	1130
Indiana, 1931	14	2	16	25	44	32	158	259	376	3	379	139	3	615	2	44	64	867
Kansas, 1931	2		2	11	3	23	40	77	565		565	72	2	629	2	16	52	773
Kentucky, 1931	7	2	9	31	21	20	69	141	195		195	39	2	452	2	10	27	532
Maryland, 1931	11	2	13	31	9	27	89	156	274		274	93	7	741	4	18	85	948
Michigan, 1931	19	3	22	52	73	77	212	414	753	14	767	652	44	2081	14	141	173	3105
Minnesota, 1931	6		6	20	10	22	69	121	234	1	235	72	3	489		31	45	640
Missouri, 1931	19	3	22	31	33	34	102	200	430	1	431	123	9	781	5	29	66	1013
Montana, 1931						1	2	3	22		22	11		19		1	2	33
Nebraska, 1931	2		2	5	1	7	35	48	161		161	44		278		14	15	351
Nevada, 1931				4			3	7	23		23	9	1	15		3	1	29
New Jersey, 1931	16	3	19	72	37	63	175	347	409	6	415	319	38	927	20	69	91	1464
New Mexico, 1931				4		7	20	31	79		79	23		89		2	8	122
New York, 1931	50	22	72	139	110	148	531	928	698	24	722	835	75	1958	30	136	204	3238
N. Carolina, 1931	9		9	47	10	42	108	207	435		435	115	3	872	1	19	63	1073
N. Dakota, 1931					1		1	2	14		14	3		16		1	2	22
Ohio, 1931	57	8	65	136	167	118	568	989	1582	9	1591	416	28	2381	16	149	318	3308
Oregon, 1931				10	10	15	45	80	131		131	35	2	182		4	18	241
Pennsylvania, 1931	92	12	104	279	135	195	717	1326	1836	17	1853	932	100	2679	45	194	328	4278
Rhode Island, 1931	8		8	16	9	12	39	76	71		71	59	7	136	2	8	16	228
So. Carolina, 1931	7	1	8	16	7	11	46	80	197		197	33		366		10	15	424
South Dakota, '31				6	4	9	21	40	53		53	10		49		11	10	80
Utah, 1931					1	1	3	5	33		33	6		21		2	4	33
Vermont, 1931				4	2	3	12	21	38		38	17		30		5	6	58
Virginia, 1931	15	2	17	45	33	37	109	224	569	2	571	97	4	637	2	32	93	865
Washington, 1931	25	2	27	57	59	58	150	324	547	1	548	181	6	684	5	46	89	1011
W. Virginia, 1931	12	1	13	34	19	26	86	165	192	1	193	62	1	365	1	13	50	492
Wisconsin, 1931	11		11	44	30	51	106	231	330	1	331	198	14	703	7	46	82	1050
D. of Col., 1931	8	1	9	10	31	15	53	109	233		233	66	1	292		24	35	418
Line Total, 1931	514	79		1377	1116	1365	4368		12876	111		5881	455	22262	222	1291	2340	
Group Total, '31			593					8226			12987							32451

*Not in production.

100,000 ATTENDANCE AT LOS ANGELES SHOW; SALES NEAR PEAK

Los Angeles, Jan. 25.—More than 100,000 persons attended the twentieth annual Los Angeles automomile show that closed recently after a ten-day run. It was considered the most successful ever held in many respects. More than 300 models were on display.

Scores of sales were recorded at the show, according to George S. Pelton, chairman of the show committee, and Burt Roberts, show manager, and they declared that the public reaction to the new model automobiles bears out the prediction of the industry that a prosperous year is in store.

While definite figures are not available, a check of the dealers indicates that more bona fide sales were made and more fine prospects for sales were developed than at any show in the last five years.

F. W. D. NAMES SHEDORE ASS'T. SALES MANAGER

Clintonville, Wis., Jan. 25.—The Four-Wheel Drive Sales Company of Clintonville, Wis., has announced the appointment of T. G. Shedore, former manager of the national accounts department, to the position of assistant sales manager. Mr. Shedore has been a member of the FWD organization for the past sixteen years and has advanced from the position of a mechanic in 1917 to his present capacity in the sales department. Thoroughly familiar with all the details in four-wheel drive truck construction and with a background of eleven years of sales work, he brings to his new position a wealth of experience.

REGISTRATION STATISTICS, DECEMBER, 1932

which are furnished by the New Jersey Motor List Company, New Car Division, Trenton, N. J. Metropolitan district figures, compiled by Sherlock & Arnold, New York city, are included Readers desiring county, city ortown lists, or lists of owners in any given section may obtain these by addressing any of these three companies.

New Jersey, New Mexico and Vermont

States	HUDSON GROUP			STUDEBAKER GROUP				WILLYS-OV-R-D GR'P			NON-AFFILIATED MANUFACTURERS									State Totals
	Essex	Hudson	Totals	Pierce-Arrow	Rockne	Studebaker	Totals	Willys-Overland	Willys-Knight	Totals	De Vaux	Franklin	Graham	Hupmobile	Marmon	Nash	Packard	Reo	Miscellaneous	
Arizona	6	1	7		1	6	7	1		1	1					4	2			164
Arkansas																			1	52
California	129	28	157	10	104	115	229	32	11	43	6	7	47	25		66	42	7	44	3,535
Connecticut	13	5	18	1	11	10	22	8		8		5	4	20		12	12	3		690
Delaware	2		2		1		1	1		1		1		3		3	3			142
Florida	31	2	33		7	5	12	5		5		3	16	1	5	11	6	6	154	1,185
Georgia	3		3		23	2	25	3		3		1	3	7		4	7	2	20	427
Idaho					1		1					1	1			1				41
Illinois	45	3	48	7	20	23	50	29	2	31		9	18	9	1	28	36	12	3	1,432
Indiana	27	6	33	2	8	18	28	12		12	1		4	7	2	6	5		5	739
Kansas	12		12		6	1	7	4		4			1	2	2	3	2		1	341
Kentucky	23	2	25	1	10	6	17	14		14		3	1	5		2	8	3	19	857
Maryland	44	10	54	1	22	27	50	51	1	52		3	5	2		13	5		3	916
Michigan	77	25	102	3	67	29	99	25		25	6		26	27		9	16	16	3	2,983
Minnesota	15	2	17		15	9	24	20	1	21			5	37		4	5	2	1	732
Missouri	27		27	3	15	14	32	22	1	23		1	6	21		12	15	8	1	1,344
Montana	1		1											1						40
Nebraska	2		2		4	3	7	8		8			3	4		1	1	1	1	228
Nevada													3							17
New Jersey	71	6	77	11	35	43	89	43	14	57	5	10	19	33	3	31	37	13	9	2,293
New Mexico	1		1		1	2	3	1		1		1				1				186
New York	62	14	76	14	34	70	118	59	9	68	9	18	35	34	1	55	35	15	13	2,507
N. Carolina	42	5	47		8	4	12	4		4	3		4			2	5	1	31	1,164
North Dakota					2		2													22
Ohio	136	26	162	4	82	40	126	105	4	109	8	14	45	38	4	30	37	8	8	4,664
Oregon	2	1	3		4	6	10	1		1	3		5	2		10		3		303
Pennsylvania	181	28	209	9	91	86	186	130	5	135	2	22	82	81	2	71	62	22	35	5,926
Rhode Island	11	1	12	1	4	4	9	1		1		5	4	6		4	1	5		296
South Carolina	8		8		7	2	9	1	1	2				3			2		36	414
South Dakota	1		1			1	1						1	1		1			1	94
Utah	1		1		1	1	2		1	1			1			1	1			30
Vermont	8	2	10					2		2		1	1	1			1			89
Virginia	28	5	32		11	7	18	19	1	20	1	2	5	11		12	3	1	3	881
Washington	25	7	32	1	23	24	48	13	1	14	1	3	7	4		16	3	2	1	815
West Virginia	20	2	22		6	1	7	6		6			6			6	3	1		584
Wisconsin	25	7	32	4	15	9	28	20	3	23	3	2	6	6		22	7	1	1	822
Dist. of Col.	15	1	16	1	11	13	25	83	1	84			8	10		10	8		3	565
Line Total	1094	189		73	650	581		723	56		49	112	372	401	20	451	370	132	397	37,520
Group Total			1283				1304			779										
Arizona, 1931		1	1			9	9	2		2	1					12	1			260
Arkansas, 1931						1	1	1		1										45
California, 1931	29	36	65	24		293	317	97	21	118	45	9	58	47	9	95	58	25	35	5,306
Connecticut, 1931	18	7	25	5		37	42	21	5	26	5	5	13	12		27	13	9	3	1,085
Delaware, 1931	3		3			4	4	7	3	10			1	1		5	5	1	5	260
Florida, 1931	31	24	55	1		28	29	11	5	16	3	3	24	8	7	22	9	2	3	1,885
Georgia, 1931	2	9	11	1		3	4	4		4		1	2	1	3	17	4	3	2	396
Idaho, 1931						3	3				2		2			1				141
Illinois, 1931	42	19	61	11		47	58	73	10	83	4	14	22	17	19	61	61	9	57	2,389
Indiana, 1931	38	20	58	2		45	47	88	3	91	3	13	18	8	12	23	11	4	5	1,814
Kansas, 1931	27	18	45			14	14	45		45		1	3	2	1	12	3	4	6	1,553
Kentucky, 1931	15	3	18			28	28	27	2	29	4	3	8	6	3	7	7	10	6	1,006
Maryland, 1931	26	10	36	7		40	47	24	8	32		5	8	8	3	13	15	6	4	1,568
Michigan, 1931	104	48	152	8	2	86	96	49	17	66	10		45	43	11	36	47	37	21	4,872
Minnesota, 1931	5	11	16			24	24	31	3	34		1	8	8		23	6	4	3	1,129
Missouri, 1931	27	10	37	7		27	34	68	2	70	4	25	18	18	41	19	9	3	9	1,953
Montana, 1931		2	2			2	2	4		4				1		1				68
Nebraska, 1931	3	3	6	1		18	19	23	2	25			2	2		4	1	3	2	626
Nevada, 1931	3	3	6			1	1						1				1			68
New Jersey, 1931	46	15	61	14		100	114	57	17	74	10	11	26	25	21	87	31	7	22	2,724
New Mexico, 1931	1					3	3	1		1			1	1	1	5		1	1	247
New York, 1931	95	45	140	29		244	273	116	40	156	15	35	56	50	17	249	103	33	34	6,121
N. Carolina, 1931	26	10	36			14	14	15	1	16	4	1	3		2	7	5		5	1817
N. Dakota, 1931	1		1					2		2					1					42
Ohio, 1931	113	49	162	5		180	185	304	50	354	19	58	67	57	22	92	54	33	50	7106
Oregon, 1931	4	1	5	1		20	21	7	3	10	2	1	11		3	5	1	5	3	519
Pennsylvania, 1931	141	67	208	33		264	297	297	36	333	30	149	120	94	41	192	117	32	48	9,222
Rhode Island, 1931	14	7	21	7		14	21	8		8	3	2	3	3	1	9	3	9		465
So. Carolina, 1931	7	1	8			10	10	1		1			2	2			1	2	1	736
South Dakota, '31	1	1	2			7	7	6		6	4		1	2		3		2	2	202
Utah, 1931	3	1	4			2	2				4		1	1		9			2	94
Vermont, 1931	5	2	7			2	2	1		1	1			2		3	1	2		136
Virginia, 1931	34	20	54	3		28	31	17	2	19	1		10	21	1	23	10	7	9	1863
Washington, 1931	26	13	39	3		101	104	48	18	66	20	5	31	16	2	42	11	15	18	2,219
W. Virginia, 1931	15	11	26			17	17	28	6	34	3	1	10	10	1	12	6	7	3	993
Wisconsin, 1931	25	24	49	7		67	74	52	6	58	9	4	15	11	2	64	16	8	6	1939
D. of Col., 1931	6	6	12	6		22	28	18	2	20		3	12	8	1	8	6	2	3	872
Line Total, 1931	936	497		175	2	1805		1553	262		206	350	602	485	225	1188	616	285	368	63,812
Group Total, '31			1433				1982			1815										

Production--Engineering--Factory

Edited by Herbert C. Chase

Streamlining and Safety Need Further Consideration

(Continued from Page 5)

in respect to compactness, high power for a given size and weight, and nigh economy at light loads. It deserves more study than it is receiving.

Streamline Sallies

The demand for higher speed has been the occasion for much added weight. Increased speed without basic change in the type of design has necessitated more power, larger and heavier engines and other parts in proportion. One essential factor, however, has been largely overlooked, although it is now beginning to receive some attention. I refer to streamlining. Not the kind so generally referred to in advertising, but a type of streamlining that really effects substantial decrease in power consumption. It demands a complete reshaping of bodies but not, I believe, body lines to which the public will object.

One of the great advantages of streamlining, of course, lies in the marked decrease in power required—a smaller and lighter engine will still propel the car at required speeds. Much weight can be saved on this score and a more efficient vehicle provided. If weight is kept within reasonable limits, there will still be adequate power for rapid acceleration. Thus streamlining will help to reverse the cycle of weight increase and inefficient performance now with us.

There is current a mistaken idea that a well-streamlined vehicle means one of greater over-all length, perhaps because Sir Dennistoun Burney's car was longer than most cars. Jaray has shown, however, that a short car can be effectively streamlined with great saving in power and increased economy and still give ample passenger space. Such a car, properly designed, will, in my estimation, outperform present cars in nearly all respects and provide a greater degree of comfort at lower first cost and decreased operating cost. The matter is at least deserving of most careful study. I predict that if this result is secured, we shall look back at present cars and marvel that we ever countenanced vehicles so bulky, so hard to handle and so inefficient as those we drive today.

Socks About Safety

Next in my list of criticisms is that present cars are not sufficiently safe in operation. I concede, however, that great improvements in this respect have been made in recent years and compliment those responsible therefor. Lest there be undue satisfaction in this respect, I shall point out where room for improvement still exists.

Better vision in all directions should be provided. Rear windows should be large and all pillars narrower. I shall not be surprised if a way is found to eliminate windshield pillars, especially in cars with rear engine mounting. If body racking is virtually eliminated, as it can be with a three-point chassis mounting, pillar stresses can be greatly reduced and pillar size decreased accordingly.

The same type of mounting with the front axle positioned by radius rods can be made to improve steering layout and to avoid wheel "fight" and most other steering difficulties. It will also make steering easier. All three items will add materially to safety. I have already referred to the need for better seats of correct height in reference to cowl bars and their effect on vision and fatigue which in turn affects safety. I have mentioned also the advantage of higher centers of gravity as affecting the adhesion between tire and road in cornering, and in reducing skidding tendencies. I believe that a higher center of gravity than is now common will add to rather than detract from safety. A three point chassis mounting, if properly designed, helps to keep tires in contact with the road and thus adds a safety feature. Better springs will have a similar effect.

Although much has been done to improve lighting and to reduce the glare produced by headlamps, there is still much room for improvement on both scores. I shall not elaborate on this, as all designers who drive at night must be aware of the faults encountered in this respect. The fact that many headlamps are not properly adjusted is not a valid excuse. Why not have headlamps that cannot get or be put out of adjustment by any ordinary means? Perhaps this is too much to expect, but I recommend that it be put down as one of those things to be aimed at.

Reflecting surfaces are often a source of danger. I question the use of polished plate on spare tire covers mounted at the rear of cars. Windshield reflections have been made less annoying by sloping the glass. If front window glasses could be sloped also other annoying reflections might be avoided.

Better braking, perhaps with power application, can also add to safety, although there is far less room for improvement in this respect than there was a few years ago. Construction that keeps water and oil away from braking surfaces and always maintains the latter in optimum condition has advantages which are so obvious that they are often overlooked.

The elimination or simplification of controls that tend to prevent maximum concentration on driving would add to safety and should be encouraged. Automatic choke and heat controls are a step in this direction. If, as seems likely, the gear shift can be eliminated, there would be further gains in safety and in convenience of driving, and perhaps also in mechanical simplification. European developments in which hydraulic turbo-torque-multiplying devices are employed merit study on this score, especially as the amount of driving done today in any but direct drive is very small. If control could be simplified to include only a steering gear and one pedal—not an impossible attainment—a real step forward would be attained.

While listing items that should be considered on the score that they distract the driver and make driving less safe, I am sure I ought to include radio sets. I have no quarrel with radios in general at the proper time and place, but I am confident that their use in an automobile, at least when it is in motion, and the driver directs his attention to tune it or to listen to it, is not in the interest of safety. The driver has quite enough to do to concentrate on driving under modern traffic conditions without such distractions. If he must have a radio and use it while driving, the controls for it should be as simple and easy to reach as a hand throttle, and should not involve a figured dial. Otherwise the car may climb a pole while attention is diverted to tuning.

Agonizing Annoyances

Hand brakes are no longer called emergency brakes, I suppose, because they are seldom of much use in an emergency, and often leaves much to be desired even for parking purposes. This is certainly not in the interest of safety. Some hand brakes are so badly placed that short-armed drivers cannot reach them at all. One prospective purchaser told a dealer he wouldn't buy a new car because his best girl couldn't reach the hand brake. The dealer is said to have replied, "Our car is perfect; why don't you get a new girl?" I have heard of other drivers who lost the respect of their best girls because of the things they said about hand brakes which require two hands to release. I have a brake of this kind on my own car. I admit addressing a few remarks in its direction, but you may be sure I didn't design it. Such items are among the annoyances that ought to be avoided.

I suppose that few designers are required to clean, lubricate or otherwise care for cars of their own design, and I am serious when I say that this is unfortunate. There is, of course, a large group of other owners who never perform such operations, but I am sure they are in a minority, especially since 1929. The owner who cares for his own car doesn't enjoy standing on his head or wallowing on his back or his belly to get at inaccessible points that need lubrication or bolts that need tightening. Perhaps if car designers tried it they would see that fewer points required lubricant and that the number of inaccessible items needing occasional attention were minimized. I shall not go into details on this score, but I suggest that every designer go as far as he can in this respect. May I suggest also that there is at least one type of spring, and a mighty good one, too, that requires no shackles or other substitute fastening to the chassis? Its use would eliminate the need for about a dozen points that require lubrication on most cars as well as many parts that are a constant source of squeaks or rattles in the average car.

I also recommend that the porous bronze bushing be considered for numerous applications in which plain bushings are now used. I have seen porous bronze bushings used in shackles, for example, that showed practically no wear even when lubrication was neglected, whereas on the same vehicle in a precisely similar location an ordinary bushing was worn almost through in a few thousand miles although particular care was exercised to grease it in the regular way at frequent intervals. Such bushings rarely if ever seize, have ample strength when properly proportioned, and they hold enough oil in their own pores to last for long periods. Where more oil is needed, a felt pad or wick soaked in oil and in contact with the outer surface of the bushing will keep it lubricated almost indefinitely. Bushings of this type are excellent for such points as king pins and steering connections, shackles, brake shafts, water pumps, generators, ignition head shafts and like applications. And they cost little if any more than plain bushings.

Water pump glands and bushings give frequent trouble for lack of careful design and lubrication. Grease cups on pump bearings are uncertain and in some designs where alemite or similar fittings are used in their place a service station attendant with a gun operating under several hundred pounds pressure may shoot several pounds of grease into the cooling system without knowing it! Porous bronze bushings work well in such applications. They require no oil holes, yet oil or grease can be fed through their pores from a surrounding chamber with the greatest ease. There is nothing very new about these facts, yet an examination of almost any modern chassis will show that they are almost totally disregarded.

Complication Complexes

My indictment declares that present cars are too complex. This is an easy charge to substantiate. It is not so easy to avoid. Unfortunately the elimination of manual controls in favor of the automatic type almost invariably leads to complications, but may be well worth it. It has had this effect in recent developments but the added complexity must make the service managers gasp—if that's the right word. Even if I knew how to point out in detail how simplification can be achieved, it would take more time and space than can be given here. I suggest, however, that whenever new construction is contemplated, a competent engineer and experienced production and service men be delegated to study the proposed design with the sole purpose of simplification in mind. I believe that their combined efforts would invariably save far more than their time costs, for I am convinced that hurried designs result in much unnecessary complication.

Much the same might be said about cars being hard to service, and about the possibilities of a similar remedy. A great deal has been done and is still being done to minimize the need for service, and the modern car is remarkably trouble-free. Nevertheless, some of them still require that the rear axle be moved back and the gearset be taken off to permit of replacing clutch facings, and items of this kind are not my idea of maximum accessibility! Excessively low cars have made the service man's job harder also, and so has the modern vogue for hiding everything mechanical behind skirts or aprons of sheet metal. The end may justify the means, but it may also ruin the disposition of service men! In any case, a little more forethought certainly would eliminate countless service troubles. I am certain that the passenger car designer could learn a lot about accessibility if he could find more time to spend in the service station. Studies of modern bus design might also prove profitable, even though the service problems to be met are far from being identical, and buses are not yet perfect by any means, with respect to accessibility.

Recent developments have resulted in easier starting and smoother running during warming-up periods, but there is room for further improvement in both respects, especially in cold weather. Better ventilating means might be provided to advantage on most cars and better heating facilities for cold weather would also be appreciated where much cold-weather driving is done. There are some advantages in steam cooling and steam heating systems still to be realized in practice.

These are only a few of the possible refinements that might be effected. I shall not add further suggestions at present, but shall rest my case and leave those who have followed this "brief for the prosecution" to judge which counts in this indictment shall stand and which shall be quashed.

Tests Indirect Air-Cooling For Aviation Engines

In the paper by J. H. Geisse at the aviation session of the S. A. E. meeting, particulars were given concerning a series of tests made on a Comet engine in co-operation with the Bureau of Aeronautics of the Navy Department.

The purpose of the tests was to determine the effects of a special system of cooling on an aircraft engine, which, instead of being connected to a radiator has finned surfaces on the outside of its jacket itself, the jacket space being filled with ethelyne-glycol or diethylene-glycol retained under pressure.

In this type of cooling system the heat is transferred to the cooling solution, which in turn dissipates the heat to the air-cooled fins on the outer wall of the jacket, which are in the slip stream of the propeller. The advantage gained as compared to a separate radiator are intended to be decreased drag and a high rate of heat transfer resulting from the large difference in temperature between the colling liquid and the air of the slip stream. It is contended that the cooling surfaces when made a part of the engine can be given a more favorable streamline form than when a separate radiator is employed.

In this test the engine developed faults presumably independent of the cooling system, so that the true merits of the latter as compared to other forms of cooling seem not to have been satisfactorily answered and may not be with this engine, as the makers have suspended operations. Successful tests runs were made, however, with coolant temperatures in excess of 400 deg. F. and brake mean effective pressures (corrected) of 100 pounds per square inch were secured. The author indicates that the results secured are somewhat inconclusive in certain respects, but seems to feel that this form of cooling can be applied to advantage in future engines for aircraft applications.

FISHLEIGH PROTESTS OVER STANDARDIZATION

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dustry cannot long disregard, met with an enthusiastic response. A summary of the paper follows:

Standardization has assumed tremendous importance; in production, service and engineering. It is at once the strength of the automotive industry and its weakness, according to the author. S. A. E. Standards, whereby interchangeability is facilitated, numbers of sizes reduced, quality of material maintained and costs lessened, are in daily use by every automotive engineer and production man and parts manufacturer.

But standardization in the American automotive industry has not stopped here, the author says, at its best and in its strength. It has gone out into a fog of "super-standardization" which threatens not only to obscure the character of individual manufacturers themselves, but to block successful progress in the industry as a whole. The purpose of the paper is to call attention to several present-day conceptions which, consciously or unconsciously, have become enveloped in this fog of super-standardization and which had best be otherwise.

Some of the major points are considered under the headings: High Speed Alters Fundamental Considerations, Radical Improvements Logical, Super-Standardized Fallacies, Streamlining and Rear Engine Installation and Tear Drop Cars. The paper ends with a graphical picture of the composite operating advantages of the streamlined tear drop car over those of a conventional sedan.

STREAMLINING MAY MEAN 50 MILES PER GALLON

Detroit, Jan. 25.—There is not the least doubt that one of the most timely and important papers read before the annual S. A. E. meeting this week was that presented before this afternoon's streamlining session by W. E. Lay, professor of mechanical engineering, University of Michigan, and his associates, C. D. Holton and R. B. Patterson, presented a paper describing a far-reaching program of research work on the effects of streamlining, and giving the results of model and full-scale tests which should prove of utmost importance to designers who seek to do a real job of streamlining on their products in the future. By its title, "Fifty Miles Per Gallon With Correct Streamlining?" the paper indicates that such a result is quite possible with a car built with due regard to minimum air resistance, especially if fitted with a type of gearset or torque-conversion unit that will enable the engine to run most of the time under such a load that its economy is high.

In a forthcoming issue, Automotive Daily News will present in greater detail Professor Lay's remarks on the progress of streamlining, and will also publish Mr. Fishleigh's paper on revision of motor car design.

COURTNEY PROPOSES FIGHT TO ELIMINATE TRUCKING RACKETS

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mobile Club of Illinois; Robert Nau, traffic expert of the Chicago Association of Commerce; Leslie J. Sorenson, city traffic engineer; Michael J. Igoe, South Park commissioner; Judges McGoorty, Brooks, Burke and Allegretti.